

Lawn Care®

BUILDING & MAINTAINING

Owen Scott

THE
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GUIDE



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Lawn Care

Building & Maintaining

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Planning the New Lawn

PRELIMINARY STUDY is just as helpful to good lawn building as it is to home building. A better lawn is possible at less cost if early consideration is given to saving of topsoil, utilizing the natural grade to best advantage and making plans so the actual seeding will be done at the best time of year.

Many new lawns turn out disappointingly because they were planted at the wrong season. In most localities the one best time is late summer or early fall when shorter days and cooler evenings are in the offing. Germination and seedling growth are better when the soil is warm but the days not quite so hot and moisture more abundant. The fall planting season may get under way in August, extend through September or later if weather conditions permit working the soil.

A good lawn can be produced in the spring but it takes more attention than one sown in autumn. With good soil, proper watering and mowing, lawns may be started in the summer with reasonable success. Generally speaking, after trees are leafed-out, it's better to plant a temporary grass or clover cover, making the permanent seeding in the late summer.

In the mid or deep South, warm season grasses such as Bermuda and Zoysia are best seeded in late spring or early summer.

It is well to budget the cost of a lawn as part of the cost of the home. The main expense will be in grading and soil preparation. If topsoil must be brought in, this may cost from three to five dollars per cubic yard. Unless a substantial fill is needed, it may be better to utilize the soil on the property in preference to a big outlay for imported topsoil.

No matter how rich the soil, it is important to apply a good grass food just before seeding. The cost of good seed and fertilizer is not apt to run more than five dollars per 1000 sq ft (50 x 20 ft) — a small part of the total lawn cost.

It is of prime importance that the highest quality seed be used. It costs more per pound, but generally less per lawn because fewer pounds are needed. It is unwise to risk the total lawn investment by use of inferior materials.

The Lawn Grade

The lawn is usually the dominant feature in the landscape picture. It sets off the house and enhances other landscape plantings. Walks, shrubs, flower beds and statuary are better placed at the perimeter of the lawn since clear areas create an illusion of spaciousness.

The direction of slope should be given consideration in the lawn plan. In general a northern or eastern exposure is more desirable. The southern and western slopes are subject to more intensive rays from the sun and so suffer more from heat and drought.

In grading, it is desirable to maintain natural and gradual contours. Avoid severe grades wherever possible. They are difficult to establish and maintain because of erosion by heavy rains and extreme drying in periods of drouth. Abrupt changes in grade cause mowing difficulty.

Soil Problems

Probably the most important single feature in building the lawn is the soil. Good loamy topsoil is valuable and makes the best lawn, garden or farm. — (See Chapter 2)

Before the basement is dug or there is any filling or grading of the property, topsoil should be saved by pushing it to one side for later replacement.

In case a substantial fill is necessary, this may be made in part with subsoil but the upper 4 to 6 inches should be good topsoil if possible. The fill dirt should be free of large stones. It is better if it is somewhat sandy or gritty as this will provide better underground drainage and will not compact as readily as pure clay. Many poor spots in otherwise good lawns are due to the effect of buried building debris.

If heavy rains drain slowly due to impervious clay or hardpan, installation of tile drainage should receive serious consideration. Growing conditions will be better for the lawn, shrubs, trees and the garden if surplus water is removed. Basement leakage will be less of a problem if the ground is well drained.

Scotts Lawn Research of Marysville, Ohio will analyze soils and make recommendations regarding them at nominal cost. It is advisable to learn in advance the general classification of a soil, how it should be handled and whether it needs lime in addition to fertilizer.

Plans For Watering

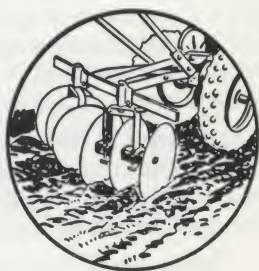
There are advantages to automatic irrigation systems with pipes concealed underground. If such a system is to be installed, plans should be made in advance so this work can be scheduled in proper sequence. Even if an elaborate system is not included, it is a good idea to give thought to the location of convenient spigots to attach hose.

Usually just one or two connections are placed in the house foundation. These are hard to get at. Flowers and shrub plantings are often injured in connecting the hose. It is better to run pipes underground from the house to convenient accessible locations in the lawn. A ten-inch tile with a wooden cover makes an inexpensive terminal and faucet location.

Tools For The Job

If the owner decides to build the lawn himself, he may find it advisable to hire some of the heavier work done. For example, large grading jobs are quickly handled by bulldozers or tractors equipped with blades. A rototiller or similar cultivator may accomplish in an hour the amount of soil preparation that would otherwise require days of hand labor. Such machines and operators for them may be hired by the hour in many localities.

Garden tractors with plows, disc and spike harrow will help in readying lawn soils. This equipment or the tillers



Garden tractors with plow and disc attachment are useful in lawn soil preparation.

will also aid in the incorporation of organic matter. Small hand equipment required includes spades and shovels, a heavy hoe and two types of iron rakes. The usual garden rake is all right for the lighter work but a heavier road-grading style will save time in cultivation and leveling.

A water ballast roller is helpful in lawn building as is a seed and fertilizer spreader. These machines may be rented from local hardware or seed stores, although it is better to invest in a spreader because of its importance in lawn maintenance. The spreader should be of a type that is accurate for seed sowing as well as grass food applications.

Adaptable Grasses

Fortunately the most desirable lawn grasses will thrive over a major portion of the Northern Hemisphere. There are excellent lawns in Alaska and Canada of the same lawn seed used so successfully over most of the U S from Maine to Washington, California to Georgia and even in higher elevations of Mexico.

The most attractive grasses withstand extreme cold better than protracted periods of unrelenting heat. Thus daytime temperatures over 100 may be tolerated by grasses if the nights are cool so the soil temperature does not get too high.

In the commercial cotton zone of the South, rank growing sub-tropical grasses crowd out all other grasses in hot weather, except in the shade. Since these grasses turn brown when the weather gets cooler, it is necessary to sow seed in the fall if a green lawn is desired over the winter months.

Choosing the lawn goal in advance is a good idea. Generally speaking, lawns fall into three categories:

1. The *deluxe lawn* or picture lawn — requiring moderately good soil, careful preparation and maintenance including regular watering during dry weather.
2. A *good lawn*, the one for casual living not requiring the finesse of care given the deluxe lawn.
3. The *utility lawn* developed where the soil is not so good, rough usage is expected, minimum care is desired.

Most lawns can be improved by proper care so it is not necessary to be forever satisfied with a second rate lawn.

The matter of seed selection for these different classes of lawns, is discussed in another chapter. Differences in the maintenance program are pointed up in various sections of this book.



Soil for the New Lawn

SOIL provides the lodging place for grass. If it is good quality garden loam the problems of starting and maintaining the lawn will be easier. On the other hand, most lawns and many excellent ones are growing in stiff clay subsoils or light sandy soils almost devoid of organic matter. Their owners have exerted the extra care in management, feeding, watering and mowing that enables them to enjoy lawn success in spite of poor soil.

Good soil is precious and one blessed with it should husband it with care. One of the commonest mistakes in home building is the practice of covering good topsoil with excavation dirt and building debris. Thus in a few hours centuries of nature's accumulation of topsoil may be lost.

Origin of Soils

Soil is formed by the breakdown of rocks and varies according to the type of native rock, climate, slope, age, organisms and organic additions. The presence of decaying organic matter, known as humus, is the main reason weathered topsoil supports plant growth better than does exposed subsoil. Better soils are generally darker, due in part to the fact that organic matter tends to become dark brown or black as it decomposes.

The humus-rich, surface layer of topsoil is seldom more than a few inches in depth except in valleys or alluvial plains where good soil from the uplands has been deposited by wind or water. Poorer soils are generally either sands or gravels or the light colored plastic clays.

The physical condition determines a soil's value — that is, the texture or size of the soil particles, their structure or arrangement and the content of organic matter. The richness or fertility of any soil is not of primary importance. It is easy to add the necessary plant food to soils to make them rich and to add lime to overcome acidity. Even after the lawn is planted, these can be applied at the surface, but it is difficult to overcome poor physical condition.

The average person has little choice as to native soil for his lawn but he can protect good topsoil by arranging to have it moved aside before building operations are started.

Soil Types

Soils are classified as clays, loams and sands depending upon the size and proportion of the individual particles. There are, of course, mixtures of all three and various gradations from one to the other.

Unmodified clay is composed of extremely fine particles which tend to form a sticky, compact mass when wet. Heavy clays retain a large amount of water which is released slowly in dry seasons. When they do dry, they tend to bake as hard as brick. In fact pottery, tile and brick are made by puddling and heating certain types of clay.

Clay usually dries to a light color. It shrinks in drying, causing cracks and crevices through which the deeper-lying moisture escapes.

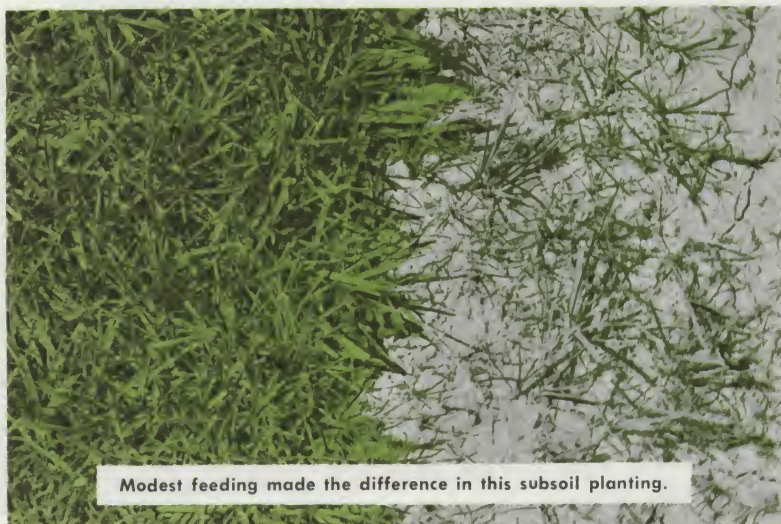
The extreme contrast to heavy clay is sand. The individual particles of sand are much larger than those of clay though the casual observer may think the opposite is true. Often clay looks coarser because minute particles stick together forming grains or small lumps. Since sandy soil is loose and frequently low in organic matter, it drains quickly and dries rapidly. Sandy or gravelly soils do not retain sufficient moisture for good grass growth in the summer months. They must be watered almost daily and even then the grass may suffer during periods of extreme heat.

The Ideal Soil

The better lawn soils are the loams made up of silt and clay with organic matter and sand to provide control or drainage of surplus water.

Those who have clay or sandy loams are indeed fortunate. Their soils are friable soon after heavy rains, yet have sufficient organic matter to carry moisture reserves for dry periods. Such soils will generally be of fairly dark color even when dry.

Since humus imparts this dark color to soils many have the idea that all dark soils are good. Not so, some of the blackest soils are simply muck such as found in drained swamp lands. These become powdery when dry and do not have the body necessary to support grass growth.



Modest feeding made the difference in this subsoil planting.

THERE IS NO DENYING the value of good topsoil. Because it is so scarce and precious, it should be carefully preserved. All too often, the work of centuries is undone in minutes by a bulldozing or excavating operation that buries valuable topsoil leaving sterile subsoil.

The introduction of topsoil is often difficult and expensive. For the long pull, the investment may be worthwhile if added in substantial quantity, possibly six inches or more.

Some try to modify clay subsoil but this requires tremendous quantities of coarse sharp sand and organic matter. Even then, the character of stiff, heavy soil is often little changed.

The picture shows one possible answer to many situations. Make use of the subsoil but be sure to use TURF BUILDER before seeding. If careful watering follows, results may be even better than good topsoil that receives the watering but not the feeding.

Note absence of weeds. Subsoil does not have weed seed content of topsoils.



Many soils that are light brown or red when dry have the appearance of a dark, rich soil when wet. It is not a good idea to judge a soil by its color when it is wet.

The physical nature of a soil can be determined by a simple experiment. Moisten a sample of the soil and roll it into a ball, exerting as little pressure as possible. Allow it to dry under normal room conditions. Then drop the ball to a hard surface from a height of three feet. If it crumbles readily it can be considered of good consistency. If it remains intact there is probably excessive clay. If it crumbles in the hand there is likely too much sand.

Improving Soil Conditions

Two procedures may provide better lawn soils. One is to incorporate liberal amounts of soil of opposite texture together with organic matter. The other is to import the equivalent of four to six inches of good loamy topsoil. When this is added, a gradual blending of subsoil into topsoil is advised, by putting down an inch or two of topsoil and mixing it into the soil in place.

Heavy Clays. The first rule in dealing with the heavier soils is to avoid working them when wet. In such condition cultivation or heavy rolling will cause serious compaction. Incorporation of sharp, coarse sand helps make clay more friable. Fine molders sand will not do as it will have the opposite effect. Pulverized slag, charcoal, sifted ashes and similar materials may be used in place of sand. Large volumes of decaying organic matter help make soils more friable.

To effect any appreciable change in heavy clay it is necessary to incorporate 25% to 50% by bulk of the coarser textured material. That means a minimum of one inch of sand to three inches of clay. Chemical soil conditioners may help some soils but the expense is considerable and the lasting qualities uncertain.

Sandy Soils. The coarser grained sandy soils are made more suitable by mixing in clay. Only a small portion is required because the fine grained clay has a greater modifying effect than sand. Possibly 15% to 20% by bulk may be enough, or at the ratio of one-half inch of clay to three inches of sand. Generous quantities of organic matter are also helpful.

Blow or beach sand will not support a lawn unless covered with 5 or 6 inches of good topsoil.



Whenever materials are being added to improve soil they should not be left as layers, but intimately mixed. If topsoil is introduced, an inch or two should be spread over the existing soil and then spaded, tilled or raked in so as to effect a gradual change from subsoil to topsoil.

After that the balance of the topsoil may be put in place.

If time permits, it is well to complete the soil modification program a full growing season ahead of the lawn planting. Some of the weeds will sprout and they can be eliminated by cultivation. Another advantage is that the soil will settle and it is better if this occurs before seeding. *A six inch depth of loose soil will settle at least an inch or two.*

In calculating the amount of topsoil needed it should be borne in mind that 16 cubic yards will make a loose fill to a depth of four or five inches over 1000 square feet (50 ft by 20 ft). This will settle to three or four inches.

Use of Roller

Soils may be damaged by rolling especially when the soil is wet. Use of a light roller or the rolling of quite dry soil is not harmful but it does not do any good either. Rolling tends to compact most soils. It is better not to use the roller at all except to press heaved sod back into the ground after spring thaws. Even then a heavy roller is to be avoided.

Soil Nutrients

Of the things that can be done to insure a better lawn, the easiest and least expensive is to incorporate in the soil generous quantities of TURF BUILDER grass food. It is well to mix this generously with the upper four to six inches of soil during surface grading. An additional application just before seeding is also suggested.

Lime for Acid Soils

Although all soils need fertilizer to assure a supply of nutrients, not all need lime. Lime is required when soils are definitely acid or lacking in magnesium or calcium. This con-

dition is typical of soils east of Ohio and high rainfall areas on the west coast. As a matter of fact, it is a wise precaution to arrange for an acidity test of the topsoil to be used as much in advance of the seeding date as possible. Write to O M Scotts Lawn Research, Marysville, Ohio; Cranbury, New Jersey or Palo Alto, California regarding soil test service.

Soil Organic Matter — Humus

By weight, not much organic matter is apparent in good soils but even a small amount exerts a tremendous influence. Bacteria, necessary for a fertile soil, live in or on organic matter. Intimately mixed with the soil, humus acts as a reservoir for moisture and nutrients. It also tends to hold together sandy soils. Conversely it opens up and separates the compact structure of clay soils, permitting aeration and moisture circulation. Organic matter may be obtained in a number of forms and the choice among those explained below is largely a matter of availability and cost.

Green Manure Crops afford one way of adding humus. Spring sowing possibilities are soybeans at 3 pounds per 1000 sq ft or vetch at one pound. This crop should be turned under several weeks before the lawn is to be planted to permit decomposition and settling. Field rye is sown in the fall at the 3 pound rate. It should be plowed or spaded into the ground in April or May to be followed by a summer crop or regular cultivation to keep weeds down. Actually cover crops have little modifying effect on the soil condition.

Stable Manure is an excellent source of organic matter. It is applied at the rate of 1 or 2 cubic yards to every 1000 square feet. One disadvantage is that it may contain many seeds of troublesome weeds. As with other humus materials there is very little fertilizing value in manure. Its main benefit is as a physical soil conditioner and as such it must actually be mixed into the soil. Surface dressings will do more harm than good because of introduction of weed seeds.

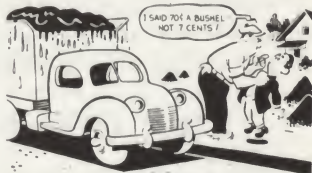
Mushroom Soil is a mixture of composted horse manure and soil which has been used in a mushroom bed for about a year. It has a value similar to farm manure but is usually more free from weeds. Mushroom soil is available from commercial growers located in many sections of the country.

Cultivated Humus is sold under various trade names mainly along the eastern seaboard. It is produced by growing

leafy crops on muck or peat land and plowing them under, allowing time for their decomposition. Then the surface is taken off, pulverized and screened. It should only be purchased from a known, reputable source.

Beware of black dirt peddlers.

Peat is another source of humus, good for working into the soil or compost. Many localities have native peat available. This varies in quality and price depending on the type and location of the bog.



Most baled peat is delivered in a very dry condition. If used that way and the lawn seeded immediately there will be trouble because the peat will draw moisture from the soil and deprive the seedlings of it.

If time permits, dry peat should be mixed into the lawn soil about a month before seeding. If this is not possible, the dry peat should be spread out in a convenient location and made thoroughly wet before it is incorporated into the soil.

To bring the humus content of even fairly good soil to a desirable amount, 15% to 20% of peat by volume is required. In preparing the soil to a depth of 4 inches, a minimum of one inch of pulverized peat should be spread out and then spaded or cultivated into the soil. The standard bale of peat covers 300 square feet to a depth of one inch.

Generous amounts of plant food must be worked in with peat or other raw organic material to feed the bacteria of decay. Otherwise they will draw on the soil supply to the detriment of the young grass plants. Where this is not done, the young grass may be spindly and yellow because of nitrogen starvation.

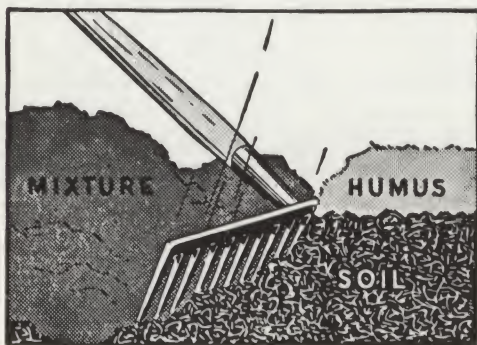
Muck is organic matter well on its way to making carbon. Its dark color is no indication of richness. Some mucks are worn out soils of clay and silt and form a hard surface crust in dry weather. Others become powdery like talcum.

Sewage Sludge is the residue of city sewage disposal plants and is usually available for little more than the cost of hauling. Some object to using it because of the odor that comes from it in damp weather. It should be used only where it can be immediately mixed into the soil and if it is known to be free from oil and other harmful residues.

Black Dirt. While organic matter tends to darken a soil, not all dark colored soils are adequately supplied with humus. Color alone is no criterion of actual soil richness. A common statement among aspiring lawn makers is "I just bought a load of black dirt" as if to imply that all lawn problems were solved. Often the "rich" looking soil is a completely exhausted muck of little or no value.

How to Use Organic Matter

Humus may be used as an ingredient in compost for topdressing of established lawns but its greatest benefit is in new



Mix humus into soil with garden rake, garden cultivator, hoe or mattock

lawn construction. An inch or more may be worked into the upper four inches of soil.

The results of an experiment conducted for three years at the Ohio Experiment Station indicate the effect of peat on the growth of grass to be al-

most 60% greater when incorporated with the soil than when applied as topdressing.

It is better to have the ground spaded or plowed before organic matter is applied, after which the material is thoroughly mixed into the soil. Humus should never be used in layers.

How to Purchase Humus

Never buy humus, black dirt or bulk fertilizer from a peddler. Thousands are badly cheated every year by succumbing to fancy stories of itinerant truck operators who peddle the stuff by the bushel. Buy only from a known source.

Organic materials are sold either by weight or by volume. Because of their sponge-like qualities much of their weight may be in the water content. It is usually more economical to buy humus by the cubic yard. When the available form is sold only by weight avoid paying a high price for water by making

certain that each ton contains a minimum of two cubic yards. One cubic yard of well rotted manure may weigh close to a ton, depending on moisture content.

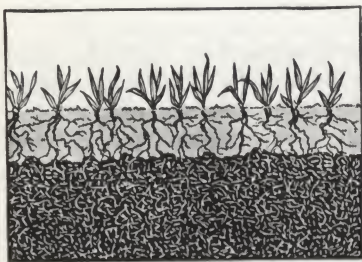
The availability of the different types of organic matter varies with the locality. Cost of handling and hauling are the main factors determining the selling price.

Composting Humus and Topsoil

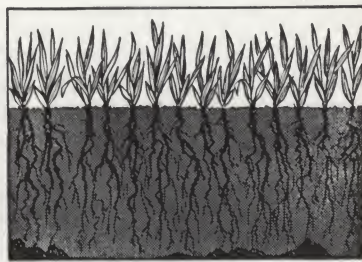
Compost is a good material to use in leveling an established lawn or in making better surface growing conditions. Compost is developed by mixing humus-forming organic materials with good topsoil and sand. This mixture is accumulated in a pile or spread out over an area for easy cultivation. Twelve to eighteen months time should be allowed for decomposition before use.

Almost any partially decayed organic materials may be utilized in making compost. Raw vegetable matter such as grass clippings or tree leaves should either be allowed to rot before being added to the compost pile or else used in small quantities. As a general rule a good compost mixture is two parts each of soil and humus with one part coarse, sharp sand. Decay of organic materials can be hastened by adding a pound of Turf Builder fertilizer and about the same amount of lime to a cubic yard of compost.

If compost is formed in a pile, the top should be slightly concaved to catch rainfall to assure moisture for decomposition.



Cross section showing how distinct humus layer limits downward root growth.



Proper soil and humus blend encourages deep roots and healthy foliage.



THE REFRESHING VALUE of cool green grass is well recognized by the Upjohn Company of Kalamazoo, Michigan, one of the most progressive pharmaceutical houses in the country. This picture gives some idea of the importance they attribute to lawns.

Conspicuously absent are signs "Keep Off the Grass" — for these are lawns to be used and workers by the hundred get outside at the lunch break for croquet, baseball or just lawn browsing.

In a recent article in the Wall Street Journal, it was interesting to note that the plant operates only seven hours a day during the summer months. According to the news account, the plan was originated years ago by the elder Dr Upjohn, founder of the company. It seems that he was particularly fond of bright green grass. He let his associates off early so they could hurry home and water the lawn.







The New Lawn Rough Grading and Drainage

ROUGH GRADING IS USUALLY the first step in actual lawn construction. The extent of grading required will depend upon the condition of the ground, the cut and fill required to attain the desired final levels, and the attention that must be given the problem of severe slopes.

It is well to utilize the natural contours of an area. Extensive grading is costly and may result in an artificial looking landscape scheme.

Any lawn should have some degree of slope, to insure run-off of excess water. Landscape men recommend a pitch of at least 6 inches in 100 feet. A change in grade is better if it is gentle. The maximum feasible grade considering mowing, watering and maintenance is 1 foot in 10 feet. Abrupt changes are best handled with terracing.

The final grade of the lawn will be fixed by certain established features such as the house foundation, the sidewalk, street or road or even the presence of valuable trees. As detailed elsewhere it is important to protect the grade above the tree root zone.

It is to be assumed that valuable topsoil will be stripped and piled to the side, out of the way, before any extensive grading operations are undertaken.

The actual grading should be in two parts. First, the subsoil grade. It is desirable to have it of the same contour as the final grade, except that it should be lower to make allowance for the addition of topsoil. Uneven topsoil depth will cause variation in lawn quality.

While subsoil grading may not always be necessary, it is particularly important if the subsoil is impervious clay which will trap excess water during heavy rains or spring thaws. Such subsoil needs to be graded so the underground water can drain by gravity, otherwise tile drainage should be installed or the saturated subsoil will prevent deep-rooting.

Underground Installations

Tile drainage lines are best installed during or just after sub-surface grading. If the topsoil from the property has not been moved aside, care should be exercised to prevent the loss of topsoil over the trenches either in digging them or in making the backfill.

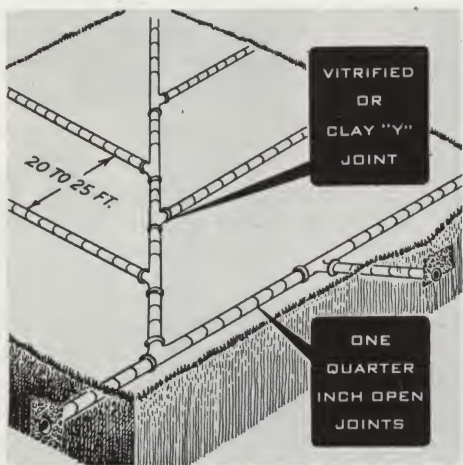
At this stage in development underground utility lines may well be installed, including sanitary and storm sewers, water lines to the house and supply lines for lawn irrigation. Other possible installations are oil storage tanks and feed lines, gas lines and underground conduits for telephone and electric service.

ALMOST ANY LAWN that will be growing in a heavy soil or where it may receive seepage water from higher surrounding ground, will be benefited by a properly installed tile drainage system.

The first requirement is to find a suitable outlet of sufficient depth into which the tile can empty. This may be

the city or county storm sewer, or for a lucky few, a nearby stream. Limited areas may be drained into dry wells formed by filling a large hole with rock and gravel.

The minimum effective fall of drainage lines is 3 inches in 100 feet. It is better to set the grade with a leveling device. The tile should be 18 to 24 inches deep and the lines generally not over 20 to 25 feet apart.



An effective lawn drainage plan. Laterals may be closer or farther apart as necessary.

A typical drainage layout is shown in the illustration. The herringbone pattern is more or less standard with a main line of 6 or 8 inch tile into which 4 inch laterals are connected. It is better if they enter at an angle with the flow of the water. Clay or cement tile are satisfactory. They should be placed with $\frac{1}{4}$ inch openings between tiles to permit easy entrance of surplus water.

It is desirable to cover tile lines with 6 inches of cinders, gravel or crushed stone before the trenches are back-filled with dirt. This makes them more efficient and lessens the chance of the tile filling with silt and mud.

Control of Grading

Before a cut is made or a low spot is filled, some levels or points of elevation need be established. On large areas



engineering help is needed to set grade stakes, particularly if the distances are over 75 feet. The amateur can set stakes for lesser distances by using a "string or line level." These are inexpensive levels, encased in metal hooks on either end for temporary fastening onto the cord. By

stretching a cord and using the line level any number of stakes can be placed at the same level. Each stake can then be marked with a pencil as to the amount of cut or fill required. The closer the stakes, the more exact the final grade.

Small lawns are usually brought to grade by good work with shovel and wheelbarrow to move the high spots into the low ones.

Larger lawns may call for the use of a tractor and plow, a scraper and leveling drag or even a "blade" powered by a jeep, small tractor or bulldozer. Sometimes other types of road grading equipment are available. Reference stakes for such extensive operations should be established at frequent intervals so that too much time will not be lost in determining intermediate grade positions.

Whatever the size of the lawn, the method of setting the stakes or the equipment used, the goal should be subsoil and surface grades of sufficient slope to drain surplus water so it does not collect in holes or pockets.

The final covering should be good topsoil, if possible, to an even depth of 4 to 6 inches or more.

Replacing The Topsoil

If extensive grading operations are carried out in wet weather, the subsoil may be severely compacted before the

job is done. If that happens, the hardened soil should be roughened by cultivation to a depth of 2 or 3 inches so there will be a mixing of top soil and subsoil and not a definite layering. The latter will interfere with normal movement of air and water through the soil and restrict normal healthy root development.

If the grading plan or the soil condition requires additional topsoil, the depth should be allowed for in the grading operation. It must be borne in mind that loose soil settles considerably. A layer of 6 inches will shrink at least one inch and maybe two. Twelve cubic feet will cover 100 sq ft to a depth of 4 inches, but this will settle to a depth of 3 inches or less.

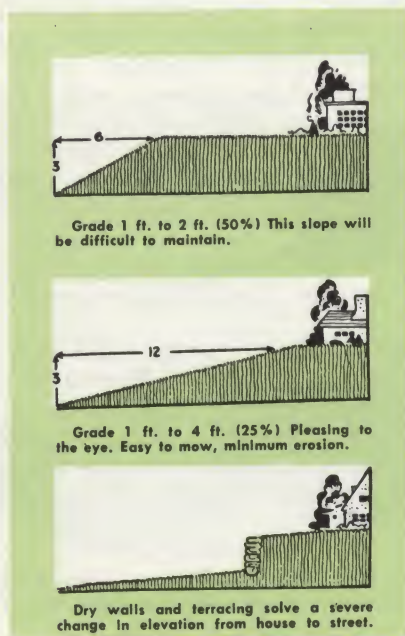
Grading Slopes and Terraces

It is difficult to maintain grass where grades are sharper than 25%, that is a drop of more than one foot in 4 feet. Grass can be held on slopes up to 50% but that is quite a severe problem. As grades approach or exceed one foot drop in two feet horizontal distance, it is better to resort to ground covers or ease the grade problem by means of retaining walls and terracing.

The poorest soil is often found on slopes because of erosion or carelessness in grading. Because slopes usually make grass growing more difficult, it is well to have as great depth of good soil as possible.

Of prime importance in this matter is the development of a gentle slope at top and at the bottom of

the grade. These are more easily achieved by working from the lower level upward when constructing the lawn. The bottom should be concave and the top convex so a mower is easily pushed up and down, that is with the fall of the slope



and not crosswise to it. Sharp angles result either in scalping or in uncut grass.

Insofar as feasible the soil should be of good physical condition. Stiff sticky clay, gravel or sand are definitely not good for level lawns and they are impossible for slopes.

Fertilize Liberally. This is important in preparation for any lawn seeding, an absolute must where turf will be struggling against severe erosion. A generous supply of lawn food is needed starting at the surface to a depth of four inches. If there is a possibility of the soil being acid lime should be incorporated.

Seeding. Some have the idea that the terrace problem is solved by planting a grass seed mixture having special adaptation for slopes. The claims are made that the grasses are deeper rooted, thicker and more drouth resistant. These qualities are desired in any lawn. The seed selection should be according to other factors in the growing condition and the planned maintenance.

Protecting Seed. Even gentle slopes may be subject to wash and erosion. Steeper grades present more of a problem. Except for a lucky break in the weather, the most careful soil preparation and seeding may go for naught unless the seed and seedling plants are protected until rooting is well established. There are many materials that are helpful if properly used.

Erosionet is the trade name of an open mesh material such as used for shipping oranges and onions. This fabric is sold by many seed and garden supply stores and by the major mail order houses. For smaller areas it may be feasible to sew together open mesh bags to use as a protective covering.

Coarse Cheese Cloth is often used, also muslin and mosquito netting. The material may be removed after the grass has started but on steep slopes it is better to keep the protection and allow the fabric to rot on the ground.

Burlap of the lightest weight obtainable offers good protection. It must be removed before the grass is ready for its first cutting because of smothering effect of burlap.

Anchoring the fabrics is a necessity. Large nails are often used but unless they are all removed, injury to the lawn mower may result. Probably the safest thing is to use notched wooden pegs to engage the material.

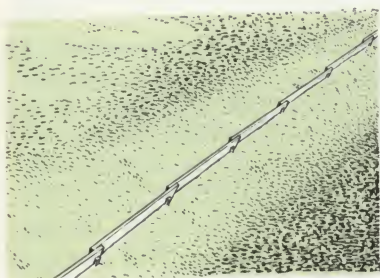
Straw may be used as mulch. A couple of inches is usually enough, the loose surplus being removed as the grass gets

started. It is best to use pegs and interlaced cords to hold the straw in place.

Any of these coverings will have a secondary benefit of helping to retain moisture.

Using Sod. Very steep slopes are often sodded but many times the results are not good because of poor sod or careless laying. The soil preparation for sod should be as thorough as for seeding. A generous amount of lawn food (and lime in acid soils) under the sod, hastens rooting and anchoring. It is well to use wooden stakes to hold the sod in place. On long grades, one foot strips of sod may be laid horizontally along the slope at three or four foot intervals to help break up the flow of water. The soil between the strips should be seeded in the usual way.

Extensive New Seedings. Sometimes the area involved makes the cost of mulching or sodding prohibitive. In such cases the run-off water may be controlled to reduce erosion damage by standing 1 x 3 lumber on edge to intercept the flow of water. These are staggered crosswise of the slope and inclined slightly downward to carry off the water before the volume and speed of flow reach damaging proportions.



Protecting Trees

Those blessed with large trees will want to protect them during grading operations. An experienced tree man should be consulted if the new grade is to be decidedly lower or higher than the natural grade under the trees.

If the grade is to be lower, a sloping mound of soil should be left around the base of the tree, extending out as far as the drip of the branches. As much soil should remain over the root zone as was there originally.

If, to the contrary, the level is to be higher, some arrangement of a dry well or a fill of gravel and stone is required under the tree so the roots continue to get needed air.



Finish Grade and Seeding

Preliminaries in lawn building include rough grading, installation of tile drainage and underground utilities. Next in order is grading of the surface to the levels desired for the finished lawn and, finally, seedbed preparation.

It is to be hoped that at least four or even six inches of good friable loam topsoil is in place. If parts of the lawn were not disturbed in grading, they should be cultivated. Extensive areas may be plowed or better still loosened with a disc set to cut three or four inches in depth. That is sufficient if the natural grade is acceptable for the final lawn.

Loam or clay soils must not be worked when wet and sticky, because they will tend to clod and dry into hard compact masses. Extensive working of most soils is better accomplished in summer when they are apt to be drier.

Smaller areas may be prepared with power rototillers, garden tractors or by hand spading. In any method care should be taken to avoid turning up subsoil and burying good topsoil.

Soil Improvement

This is the last chance to incorporate soil improving materials such as organic matter or sand. The physical condition of the soil cannot be much improved after seeding so whatever is necessary should be accomplished now.

After plowing or spading, the soil is apt to be rough and cloddy. Discs or power cultivators are useful in breaking up such soil as are garden cultivators, heavy hoes and rakes.

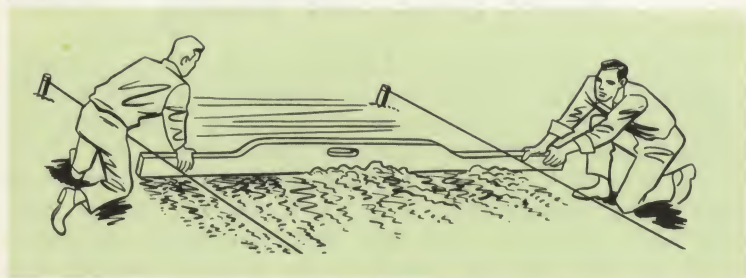
Except on large open areas, the final soil preparation and leveling is best done by hand. On acreage seedings this may be accomplished with drags, spike harrows, cultipackers and the like.

Before the final working, it is well to incorporate lime if a soil test has shown this to be needed. The raw ground agricultural limestone is usually recommended and generally applications will vary from 50 to 100 pounds per 1000 square feet or one to two tons per acre.

Final Leveling

In final grading care is needed to see that surface drainage is provided to all parts of the lawn. Depressions where

water will stand, high spots that will be scalped in mowing, or sharp changes in grade should be avoided. One way to guard against this possibility in flat lawns of limited area is to use a leveling board in the final stage of seedbed preparation.



A 12 foot plank makes a good leveling board, if one like that shown in the illustration is not available. When used, strings are stretched with the "fall" of the land, 12 feet apart. The strings are held on stakes and located on the stakes the width of the board above the desired finished grade. Thus when the board is held edgewise between two lengths of string, it is possible to ascertain the high and low spots and adjust them accordingly.

Seedbed Preparation. Alternate harrowing or hand raking and rolling serve to break the surface soil. Some clods will be raked out in the operation and these may be used to fill in low places after removal of stones and rubbish.

With heavier soils, the finished surface need not be as fine as can be developed in a sandy loam. If there is a good dispersion of pea-size particles in a clay or clay-loam seedbed, it is just as well to have a mixture of larger pieces, up to a half inch or inch in diameter — between the size of a marble and a golf ball.



Definitely to be avoided is the deep dust mulch developed at times by repeated cultivation of dry soils. If seed is planted on such condition, it may be buried so deeply it cannot sprout,





or it may be washed away in erosion of the soil by heavy rain, or blown away by the winds.

Furthermore, there is the possibility of the formation of serious surface crusting because of the puddling action of heavy rains or waterings. It is difficult for seedling grass to emerge through such a crust. A moderately coarse surface will not appear as attractive but will have crevices into which seeds can lodge and find moisture for germination. Seedlings will be sheltered from washing rains and drying action of the sun.

Apply Grass Food

It is essential that a generous supply of soil nutrients be available to the sprouting grass. Since it is more readily available if fairly near the surface, the application of grass food is recommended in connection with the final raking.

Grass food can be broadcast by hand, but a more even distribution is obtained with a wheeled spreader. The Scotts Spreaders, designed for this purpose and for sowing of seed, come in several sizes and are practical for small as well as large lawn areas.

If footprints or wheeltracks are much in evidence they should be raked out before seeding.

Grub Proofing. In the Atlantic seaboard states, grubs of Jap Beetles ruin many lawns each year. They are extending their operations westward all the time and along with white grubs of May beetles and June bugs are now serious pests around Pittsburgh, Cleveland, Detroit, Cincinnati and St. Louis.

Where there is likelihood of grub infestation it is a good idea to treat the soil before seeding with a pest control that will destroy grubs hatching from eggs in the soil.

Selecting the Seed

Too often lawn seed is purchased because of low cost per pound. Often such seed is the most expensive per lawn because coarse, large seeds fill up the package. They may not have the ability to produce a lawn but in any event they have to be planted heavily. It may well be necessary to use three pounds of ordinary seed to get as many grass plants as can be obtained from one pound of the best lawn seed.

Selection of a "Shady Lawn" mixture or a "Terrace" mixture is not the answer to either of those problems. The problems are solved by the right maintenance program as stipulated in later chapters.

The important consideration in seed selection is to consider plans for maintenance. Will the lawn be regularly watered in dry seasons, cut short, fed frequently and SCUTL-ed for disease.

Then get seed for the deluxe lawn. If, in contrast, the growing conditions will be very poor, the use of coarser, hardier grasses may be the answer. A good plan is to select the seed firm in which one has confidence, then to choose from the brands of that seedsman according to needs.

Is the new lawn to be planted in late summer when growing conditions will be favorable, or does it have to be planted in the spring?

In the latter case, can the lawn be adequately watered to bring through perennial grasses? If not, consideration may be given to planting the quick growing, more temporary grasses, with a plan to overseed perennial grasses in the late summer.

What is the environmental factor? Does the soil have reasonably good physical characteristics? Is the slope toward south and west where the hot sun gets more of a bearing on it than slopes to the east and north?

Those having unavoidably poor conditions should recognize that a deluxe lawn, as described earlier, is pretty much out of the question.



How is the lawn to be used?

If a couple of years' time can be given to establishment of a turf, then this question is not of much consequence. But if coverage is needed in a hurry to keep down dust and mud, stand the romping of children and pets, then the more rugged *Utility* type of grasses should be used.

The problems of growing grass in shade are more fully discussed in another chapter. Success in the shade depends upon a) *the soil condition*, b) *type of trees*, c) *maintenance program*. The latter is probably most important of all.

Success with turf on slopes and terraces does not come from planting a so-called terrace mixture of seed. The grade elevation should be carefully handled. It is particularly important to fertilize the soil liberally and protect the seeding against erosion.

Blends of Lawn Seed are usually better than separate varieties and O M Scott & Sons prepare such for practically any soil or climatic condition or planned use of the lawn. A descriptive price list will be furnished upon request.

Bentgrass. In selecting permanent turf-making varieties Bentgrass may well receive consideration. This has become familiar to many because of its extensive use on putting greens and its increasing use on lawns.

The pure Bentgrass makes a solid carpet-like lawn when mown closely, but is somewhat more subject to disease attacks. To bring out its full beauty, a Bentgrass lawn needs to be topdressed at least once a year. It must also be watered frequently during dry weather.

Clover. The use of clover is a matter of personal preference. It is not a grass and some feel that it has no place in a lawn. Clover may grow in patches, breaking the continuity of an even textured turf. It is also subject to winterkill. On the other hand it will thrive on poor soil and stay green in periods of drought.

If clover is desired it is better sown by itself rather than as part of a lawn seed mixture. Only lawn type clover should be used and it's better planted in spring.

When to Seed

With few exceptions, the best seeding time is right after the months of hottest weather, when the days grow noticeably shorter and better conditions of moisture are expected. Usually

heavier dews are typical of the fall season, and in most localities rainfall is more favorable. Evaporation is less rapid than in mid-summer and irrigation less of a problem.

Preparing the soil in summer or in dry periods may develop a powdery condition in the upper inch or so of surface soil. If that happens it is better to wait for rain to settle this dust mulch or water thoroughly before seeding.

It is all right to go ahead with seeding as long as the soil is workable even into November or December. Germination may be delayed until the following spring. Good seed is not apt to be harmed appreciably except in a very open winter with mostly thawing weather.

Spring seedings should be completed as early as weather permits to get good root growth before hot weather. Heat is just as much an enemy of seedling grass as drought. The actual date of spring seeding depends upon when the ground gets dry enough to work. This may be February or possibly not until May.

Summer seedings can be successful only if adequate irrigation is possible. Normal rainfall may sprout the seed but it would be unusual for nature to provide steady rains to support the seedling grass to maturity.

How to Seed

Whether seeding by hand or spreader it is well to divide the seed, sowing part in one direction, the balance crosswise to the first. This assures more even coverage and lessens the possibility of missed spots or windrows.

Covering the Seed. There is no one best procedure for covering seed. The question whether raking or brushing is better than allowing nature to bury the seed by action of rain and alternate wetting and drying is debatable.

Seed is sometimes covered by a light hand raking or by dragging a flexible steel door mat over the area. Rolling follows to firm it into the soil.

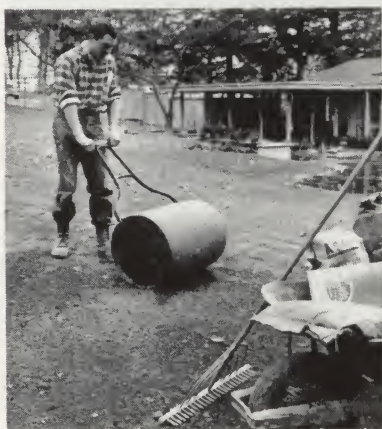


A good practice is to rake after the first part of the seed is sown, rolling only after the second. A light roller is advised, just heavy enough to firm the soil, not pack it.

Small lawns may be topdressed with an eighth-inch or so of screened soil or compost. The use of raw peat moss is a questionable practice since there is danger of the roots growing up into the peat instead of down into the soil.

Protecting the Planting

Nothing can or need be done to protect grass seeds or seedling grass except to preserve moisture and prevent washing during heavy rains. Many like to "mulch" after a late spring seeding. Clean straw may be used to conserve moisture (they reduce evaporation) and to prevent serious washing. Not more than an inch or two should be used and this ought to be raked off as soon as the grass is well started. Interlaced cord, held down by pegs, is often used to hold the straw in place.



Coarse cheese cloth or even light weight open bur-laps may be used to hold seed in place and conserve moisture. They should be removed as the grass gets a good start. Open mesh material such as used for handling oranges and onions makes a good covering to reduce erosion. This material (Erosionet) can be purchased by the yard. Anchoring any such materials is a problem. Small wooden pegs or even golf tees are safer than wire or spikes, considering the lawn mower.

Early Care

While prolonged drouth does not harm seed, its germination can be hastened by regular watering to take advantage of otherwise good growing weather. Once the seed has started to sprout, the supply of moisture must be constant or the plants may perish. Two or three waterings with a fine spray may be required on bright days until the grass gets a good

start. It is not necessary to flood the ground but the surface needs to be moist at all times. As the grass matures, watering can be less frequent but heavier.

Young turf is not benefited, may even be harmed by any covering designed to protect it from cold.

New grass should be cut when any of it gets close to two inches tall and with a very sharp mower set at 1 to 1½ inches. Dull blades pull out plants and break many of the tender hair-like roots.

Traffic should be kept off new grass, at least until after several mowings.





Lawn Renovation

AT TIMES IT IS difficult to decide what to do about a poor lawn, whether to tear up and rebuild or try to make it into a good lawn by surface treatments.

If a lawn is poor because of inadequate maintenance, surprising improvement can be made in just one season of intelligent care. Proper mowing, liming, feeding and weed control supplemented with seeding has worked wonders on many mediocre lawns.

It is certainly true that having good soil makes it easier to develop and maintain a good lawn. On the other hand, most lawns are growing in poor soil conditions and the cost of good loam, if it can be found, is usually prohibitive. The general advice then is to work with the soil in place, if it is actually soil and not stones, gravel or loose sand.



Investigation

An appraisal of the present condition of a lawn is recommended before investment of any particular time or money. After that it is well to determine a plan of action and proceed accordingly.

Check the Soil — Take soil samples as suggested elsewhere in this book in order to learn —

1. The soil classification — to know what you are dealing with.
2. The pH, which will indicate if your soil needs lime and if so at what rate.

Probe into the poorer spots or bare areas where you may find—

Buried building debris. Pockets of stone, gravel or loose sand—this should be removed to a depth of 6 or 8 inches and replaced with good soil.



Drowning of roots because of poor surface grade or impervious soil. Correct the grade by leveling with good soil.

Some turf areas are poor because of compact hide-bound soils caused by trampling. Such areas should be loosened by spading and cultivating or opened up with deep perforations made with spading fork or aerator as described below.

Improving Soils of Established Lawns

It is difficult to improve the physical soil condition under established turf. There is considerable benefit from regular feeding as it encourages greater root growth and in the cycle some organic matter is added. Sowing Clover into the lawn may help in the same way.

Limited areas of heavy compact soil may be helped by perforating the ground to a depth of four or five inches and then brushing coarse sharp sand into the holes. Special aerifying tools are available or an ordinary spading fork may be employed. After being driven into the ground, the spading fork should be worked back and forth to enlarge the holes.

Spiked rollers and spike discs are sometimes suggested for this job but ordinarily they do not cut deeply enough to do any real good in soil improvement.

The application of topdressing soil to established lawns is not justified except to level uneven surfaces or to provide a better bed for seeding bare spots. Soil fertility and grass growth are improved by regular applications of TURF BUILDER.

Procedures

Use of the Scotts Spreader is the key to most lawn activity. It is easy to set it to apply lime, TURF BUILDER, weed and pest controls as well as to sow seed.

Surface Roughing — Grass seed cannot germinate and take root if it remains on top of the ground. Actually it does not need much covering so it is not necessary to cultivate deeply before seeding. It is advisable to scarify, roughen, perforate or otherwise loosen the surface to give the seed a chance.

One of the best tools for this job is a heavy iron rake with the tines sharpened to cut ridges into the soil. Or a sharp flat spade or half-moon turf edger or ice hoe can be used to cut gashes. If seed lodges in such openings it is more likely to find the needed moisture supply and ready anchorage for the grass roots. Even if this slicing of the surface cuts some grass roots, little harm is done as the injury will soon heal.

Top dressing with a good soil or compost is beneficial to any lawn, especially in the building up of a poor lawn. This is advised particularly after seeding if the material is applied

to a depth of not more than $\frac{1}{4}$ inch. Deeper covering may delay or prevent germination.



Few of the raw organic or humus forming materials are suitable for use as a topdressing on established lawns. By their nature they are bulky and spongy so they do not readily become a part of the surface soil. Instead of spreading raw organic materials over a lawn it is better to utilize them in making compost with soil.

The development of compost for top dressing purposes is more fully discussed in Chapter 2. One cubic yard of material will provide about a quarter inch on 1000 square feet.

The top dressing material should be screened through a $\frac{1}{4}$ inch mesh screen. Some are expert at broadcasting from a shovel, others scatter from a bucket or dump in small piles and spread around with the back of a rake.

Sources of satisfactory topdressing soil include reliable nurseries, greenhouses and mushroom growers — all of whom may be able to offer so-called "spent" soil. This may be lacking in fertility but the physical condition is what counts.

It is well to rake or brush-in no matter how the top dressing is distributed. This is better accomplished if the grass is cut short before the operation is started. A flexible steel door mat is good for dragging top dressing into the sod.

Watering — Nature may provide needed moisture following early spring or early fall seedings. In dry periods, supplemental watering is needed if young grass is to be kept alive. Seed is not harmed if it remains dormant in dry soil but once the germinating activity is under way a good moisture level is needed until the grass is well rooted.

The Plan of Action — suggested for renovation of established lawns depending upon time of the year—

Late winter — early spring



Apply lime if prescribed after Soil Test

Feed with TURF BUILDER

Rake out debris, scratch bare spots

If there is much of a growth of grass cut it off closely before seeding.

Sow grass seed

If you must roll do it now. In general rolling harms lawns by compacting soil. If used at all, the roller should be light in weight.

Mow at 1 or 1½ inches as growth starts.

Spring to early summer



Apply 4-XD to control dandelions, similar weeds. Start watering as soon as surface soil begins to dry out.

Provide a follow-up feeding.

Summertime



SCUTL program to control Crabgrass

Raise height of mowing.

Continue watering

if surface is uneven, plan to level with good soil or regrade in early August so seeding can be done in late August or early September, the best time of the year.

Late summer—early autumn

Apply WEED & FEED to clean out dandelions, plantain, buckhorn while feeding the grass.

After next soaking rain, do necessary seeding.

Mid and late autumn



Lower cutting height to 1 or 1½ inches.

Keep up mowing as long as grass continues to grow.

Remove leaves so they do not mat and smother grass.



Growing Grass In The Shade

BRIGHT GREEN VIGOROUS grass in the shade zone is possible in most places and without too much effort. The answer is simply in furnishing adequate amounts of the basic needs of all growing things: food and water. This need is more critical for grass under trees because the tree roots have first call on the available soil nutrients and moisture.

Dense tree foliage filters out sunshine, but this is the least important factor. Lack of direct sunlight does not preclude the possibility of good turf. Protection from the direct rays of midsummer sun may even be a blessing.

Seeding It may be necessary to sow seed under tree-shaded lawns more often than in the sun because of greater mortality of grass plants. Selection of seed is important although varieties that make the most attractive turf in the sun have the same advantages in the shade if properly cared for especially in the matter of moisture supply.

Feed, feed, and feed again, because the trees take so much nourishment from the soil. Feed at least spring, summer and fall and under severe competitions a half dose as often as



once a month through the growing season. This is not much of a chore using a Scotts Spreader.

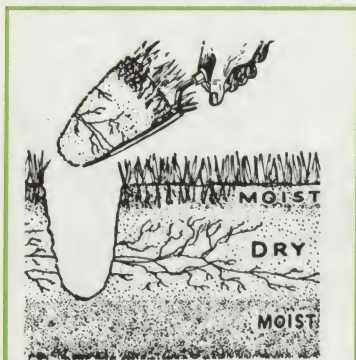
Watch soil moisture under trees. Because protection from the sun reduces evaporation, the upper inch or so of soil may remain relatively moist while the deeper soil is dried severely by the feeding roots of trees. A good size tree may take up a hundred gallons of water or more in a day. Aside from that, the lawn under the trees does not get as much benefit from summer showers. Nature has endowed most trees with a leaf arrangement that sheds rain to the outer edge of the spread of branches.

It is difficult to prescribe an exact irrigation schedule for all shaded lawns because of variations in soil, exposure and rainfall. Personal observation is the answer. If possible the water should be delivered so it is immediately absorbed and does not form in puddles over the lawn.

There are some locations where grass does not thrive because of excess moisture, especially in the early spring and late fall. Such a situation calls for re-grading or installation of tile lines.

Cut high. Of almost equal importance to seed-food-water, is the matter of mowing. A short cut is all right in cool spring weather, higher cutting to 2 inches or more is better practice during hot weather.

Still higher cutting, up to three inches, may be advisable in places protected from the sun in the early part of the day



Tree roots are apt to withdraw moisture severely a few inches under the surface, causing a dry zone. Grass roots suffer for want of water even though the soil surface may appear moist.



A thicker growth of grass from frequent feeding, watering, careful mowing will diminish erosion caused by coarse drops of water falling from large tree limbs.



It's a good idea to have a gentle slope of grass immediately adjacent to the tree trunk. This prevents accumulation of water which might drown the roots of the nearby grass.



A pockmarked stand of grass resulting from leaves lodging in the grass and smothering some plants. Avoid this by raking regularly, especially late in the fall before rains beat the leaves against the ground.

and then suddenly subjected to direct rays during the hot mid-day hours. In such cases the broiling sun wilts the grass because the breathing pores cannot close quickly enough to avoid excessive transpiration. The leaves give off moisture faster than it can be taken up by the roots. Do not neglect cutting just because a higher growth is maintained. The mowing schedule should be such that the grass is cut as soon as a half inch of growth develops.

Sometimes thick growths of shrubs interfere with air circulation across lawns. If possible, thinning or pruning is advisable to give the lawn area cross ventilation, preferably in the direction of the prevailing wind for the area.

Toxic Substances

It is sometimes said that tree leaves exude a sap that washes into the ground making the soil toxic to grass. There are instances where Nature has presumably endowed some plants with the power to excrete poisons to discourage other vegetation in the vicinity. However, there is no evidence to indict lawn trees with this toxic action. Lawns are grown successfully under practically every species of tree in North America.

True, it is difficult to have thriving grass under such varieties as Norway maples but this is due to the mass of feeding roots that grow right up to the surface and take practically all moisture and plant food from the soil.

Liming

Occasional applications of lime may benefit shaded lawns. In natural limestone country, where there is lime in the irrigation water, it may never be necessary to add lime. In the East most lawns could well be limed every three or four years. Raw ground limestone is the best form to use at the rate of 25 to 50 pounds per 1000 square feet, applied whenever convenient. Frozen ground affords an opportune time.

Pruning the Trees

Judicious trimming and thinning of trees by one schooled in the art will be good for the tree. It will also help the grass by letting in more light. Removal of low hanging branches may improve air circulation under the tree and that is good for grass health.

If grass fails between buildings it's probably due to packed, puddled soil more than shade. Open up with deep perforations made with spading fork; try to work in better soil.

Ground Covers in Shade

Do not make drastic changes in soil grade around trees without consulting an experienced tree man. Cutting away or filling in may kill the tree, by disturbing normal root functions.

There is some shade where grass won't grow. In such cases shade tolerant ground cover plants may be used.

Low growing evergreen types include: Japanese Spurge (*Pachysandra terminalis*), English Ivy (*Hedera helix*) and Myrtle (*Vinca minor*), Baltic Ivy (*Hedera helix baltica*).

It's a good idea to consult local nurserymen on such problems. In some localities they may suggest Partridge Berry (*Michella repens*) or Pipsissewa or Prince's Pine (*Chimaphila umbellata*). The latter is said to be one of the very few plants successful under pines.



One LAWN CARE reader reported being up against it because he could not get his car up the slippery incline from his garage.

Glancing around his garage, he spied a sack of Turf Builder, and nearby, his Scotts Spreader. He had the inspiration to put the Turf Builder on the driveway. It worked — a little slower than salt but he soon had a rough surface and drove away.

Eating



Not Eating



Lawn Feeding also Helps Tree

HERE ARE two elm trees on adjacent properties in heavy clay soils. Growing conditions are similar except the one to the left is on a lawn fed with TURF BUILDER four times a year.

According to growth ring borings, the tree on the left is 18 years old, the other 29 years. These same borings indicate that the trunk growth of the tree in the well-fed lawn has been double that of the other. As the pictures show, the branch growth and general appearance of the much younger tree is superior.

Feeding trees used to be laborious and expensive. Now it is recognized as a dividend of a lawn feeding program. Lawns under trees may well receive four or five feedings a year for better grass — better trees.

Traditional Method of Tree Feeding

There is much to be said for the ease of feeding trees by making applications of TURF BUILDER to the lawn under the tree. Even so, some may prefer to place the material into the root zone of the tree for quicker results.

Depth Feeding

How Much? The size of the tree and the kind of fertilizer determine the amount to be used. If TURF BUILDER is selected, a safe quantity is three pounds per inch of diameter of the trunk. Thus a tree measuring 10 inches through would need 30 pounds for one feeding.

Another authoritative recommendation on the basis of a fertilizer formula similar to TURF BUILDER is to use the number of pounds obtained by adding together (1) height of tree in feet, plus (2) branch spread in feet, plus (3) circumference of lower part of trunk in inches. Thus a tree 20 feet high with a branch spread of 15 feet and trunk circumference of 30 inches (roughly 10 inch diameter) would need 65 pounds of fertilizer.

This is not so much considering that a tree of the size described might have a root zone occupying the equivalent of a half acre of topsoil. The dosage prescribed is for a starving tree. The rate might be cut in half for a tree in good growing condition.

When? The excellent USDA Yearbook *Trees* suggests feeding regularly, preferably in the spring, but safely until mid-summer at least. Late fall, after the trees have lost their leaves, is also recommended for trees other than evergreens.



Application. The method used to get food into the root zone depends on the value of the turf above it. If there is a fair lawn under the tree and it is not desired to disturb the grass, the first step is to carefully cut out plugs of sod which will be replaced after the hole is made and the fertilizer inserted. A flat spade or turf edger may be used to remove the sod, keeping at least two inches of soil with it.

Tree food is placed deeply into the soil by making a series of holes 18 to 24 inches deep, staggered at 2 to 3 foot intervals. These holes are placed

in the feeding zone beneath the branches, starting about one-third way out from the trunk.

The boring tool used to dig post holes is satisfactory for making tree feeding holes. Spécial soil augers two inches or so in diameter and 24 inches or more in length are often used. These are available with handles for hand use or with shanks to attach to a $\frac{3}{4}$ inch electric drill.

A crowbar is often used to make holes for tree feeding. It is also possible to make feeding holes in some soils with the force of water from a hose nozzle. Some use special root feeders to open holes in the soil.

In case a new lawn is being built or renovation is necessary, holes for tree feeding can be dug with a narrow ditching spade. In such situations it's a good idea to improve the soil condition under the trees. A generous addition of humus matter and plant food should be worked into the soil to the depth of a foot or more.



Use a wide funnel to pour Turf Builder so it is not spilled on the grass. Holes may be straight or at an angle.

The number of holes needed is determined by the quantity of fertilizer to be applied. The amount per hole should be one-half pound to one pound (about a pint of TURF BUILDER). Thus if the formula calls for 30 pounds, up to 45 holes may be made to advantage.

After the fertilizer is put in the holes, replace dirt, tamping it well, then replace sod plugs.

It is then a good idea to take the spreader and give the lawn a general feeding of TURF BUILDER. This will hasten rooting of the sod and the repair of any turf injury.

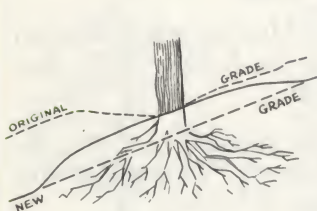
* *

Spotted growth of grass sometimes results from improper tree feeding. Grass is stimulated unduly if fertilizer is not placed deeply enough or it floats to the top of the hole in a heavy rain if the soil is not firmed above the fertilizer.

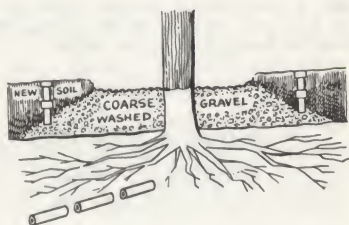


When feeding shrubs or foundation plantings, scatter the TURF BUILDER over the bed or work it into the soil mulch to a depth of two or three inches. Use one or two handfuls within the radius of two feet of each stock. Feed shrubs in early spring and again in the fall to assure maximum foliage color.

Save the Trees When Re-Grading



(LEFT) Illustration shows how to leave a sloping mound of soil around tree roots when the grade is being lowered. Note the low sloping mounds which should extend out as far as the spread of the roots.



(RIGHT) Whenever an extensive fill is required around trees precaution is necessary to prevent smothering. The above drawing suggests use of gravel, vent pipes and tile drains to insure proper air and moisture movement.



Proper Mowing

THE PRINCIPAL PURPOSE of mowing a lawn is to improve its appearance. Unless properly done, however, this improvement will be temporary, for one thing is certain — how a lawn is mowed has much to do with its health.

The important factors in mowing are:

- 1) *Start clipping as soon as there is any appreciable growth to be cut.*
- 2) *Decide upon maximum and minimum heights of cut for hot and cool seasons.*
- 3) *Try to mow the lawn before it has grown much more than a fourth of the cutting height. Frequent mowing is desirable.*

Looking to the health and appearance of the lawn, the one most important point is to mow so that only moderate growth is cut back each time. Through the centuries nature has endowed grass with the ability to tolerate frequent defoliation but the roots will suffer if too much of the energy producing green growth is suddenly removed. Grass looks bad if tall growth is cut back because the lower leaves will be brown and scraggly due to the shading effect of tall grass.

The Right Height

The reader is referred to the discussion in Chapter 1 regarding his choice of lawn goal. The three categories of lawns are not rigid castes but it is well to determine what is desired and establish mowing plans accordingly. Mowing heights may be determined on this basis:

	Cool Season		Hot Season	
Deluxe — short cut	1	inch	1 1/2	inches
Good — medium cut	1 1/2	"	2	"
Utility — high cut	2	"	3	"
Bentgrass — very short	3/4	"	1	"



In dense shade grass has to live on reduced ration of sunlight. Such lawns are better maintained at the medium or high cut levels except when tree leaves are dropping in the fall.

Vista Lawns, those viewed from a distance, do not require the neat mowing of lawns close to the house. There may be added beauty in the longer length because of the rippling sheen in the waving grass. If equipment is available, regular mowing at 3 or 4 inches will be all right. However, it should be kept in mind that such lawns will not have as thick turf as closely mown grass. If later it is desired to cut at normal height, extra feeding and seeding will be needed to thicken the turf.

Disposition of Clippings

This is largely a matter of appearance. If the clippings are evenly scattered and not heavy, it makes little difference in grass health whether they are removed or not. Clippings will be detrimental if matted so as to smother the grass. They may give the lawn a dull, brownish cast.

Clippings are of negligible value in returning plant food to the soil. They have slight value as mulch in reducing evaporation. This is a questionable blessing since a layer of decaying vegetation at the soil surface contributes to the activity of harmful fungi and molds that may cause grass diseases in wet conditions. Clippings may also harbor harmful insects.

Some utilize grass cuttings to advantage as mulch about shrubbery, in gardens or as humus-forming additions to the compost bed.

Actually the disposition of clippings can be a matter of an individual's choice as to whether he uses the catcher on his

mower, rakes or sweeps the clippings, or simply lets them work down into the turf. If the unsightliness of the clippings can be tolerated for a day after cutting, there will be less bulk to rake up and carry off.

Lawn Sweepers are excellent for gathering clippings and help give the lawn a better groomed appearance.

Type of Mowers

It is a matter of individual determination whether the lawn is cut by hand or with power, with the traditional reel type mower or the newer rotary blade types. The important considerations are:

- 1) *Select a good machine, one that has the range of cutting heights needed.*
- 2) *Keep it sharp and in good adjustment. Many lawns have a brownish cast after mowing due to tearing or bruising of the grass blades in mowing.*
- 3) *Rotary mowers have certain shortcomings but outstanding lawns can be maintained if relatively free from undulations, surface depressions or high spots.*

Other considerations regarding mowing equipment include weight, ease of manipulation, ability to trim close to trees and shrub beds, danger to users and others. There may be some advantage in the suction action of rotary mowers in pulling grass to an upright position in the cutting.

Pattern of Cut

If convenient it is well to alter the direction and pattern of lawn mowing from time to time. One problem is that one of the mower wheels is traveling on uncut grass. This flattens a track of grass especially during lush spring growth. If a reel-type mower is operated back and forth, the action of the cutting reel tends to push the track of depressed grass down further and miss cutting it. This usually results in a ridge of uncut grass, unless the lawn is mowed a second time.



One way to help overcome this is to mow around the plot as shown by the diagram. In round and round mowing, if the rotation is such that the clippings are thrown into the uncut grass, they will be chopped and scattered a second time.

Special Mowing Problems

Steep Terraces should be mown up and down with the slope. To cut crosswise of the ridge or crown will cause scalping. If the slope is definitely south or west, it may be better to avoid short cutting because of the stronger bearing of the sun on such exposures. A taller growth of grass insulates the soil and roots to some extent and helps reduce soil erosion.

Seeding Spikes. It is normal for grasses to shoot up flowering seed stalks in late spring or early summer. This characteristic may even appear in regularly mown lawns in some seasons. Scattered seed stems may hug the ground and get quite coarse. This is more pronounced in some types of grass than others but may develop in any lawn, especially one having bare or thin spots.

The period of this seeding is usually limited to a couple of weeks. Extra patience in mowing, possibly raking up the prostrate stems, use of grass shears, sickle or grass whip may be called for. Another solution is to cut the scattered seeding stems with a sharp spade or ice hoe before or after mowing.

Matted Growth. Some lawns, especially those of vigorous growth with considerable bentgrass, may get very thick and matted after a few years. This is more apt to happen if the mowing height is medium or high. A matted growth harbors disease and causes browning of the lower leaves. The remedy is short cutting with vigorous raking or brushing during cool seasons, raising to the medium height only in the hottest part of summer.

Lawn Renovation calls for close mowing before seeding and while the young grass is becoming established. A tall growth will choke seedlings before they can get started.

New Lawns. Too often the mower is kept off new grass because of the fear of injuring it. Actually it's a good idea to start cutting seedling grass as soon as the growth is much over an inch. A sharp, clean cutting mower is especially important.

Therapy in the Anteroom



"You were so thoughtful as to forward me an excellent loose-leaf binder containing the various lawn publications by Scotts, for my reception room at the office. It has had a very soothing effect on some of my impatient visitors in waiting; and they have darn near worn it out, passing it back and forth. I suspect that some of them have been coming in just to read up on their lawns." (A District of Columbia Doctor)



Watering Lawns

THE BRILLIANT GREEN LAWNS of the British Isles owe their beauty not to any closely guarded secrets, but mainly to ideal moisture conditions. Gentle rains fall frequently and atmospheric conditions are favorable so there is little critical drying.

Most sections of the United States east of the Rockies have an annual rainfall greater than that of England, yet the watering problem through the summer is more difficult.

Evaporation during hot weather is rapid. Many of the rains come as heavy, dashing storms so that the water runs off the surface before it can be absorbed. There may be many such heavy rains during the summer with severe drouths in between. To offset this fluctuation and provide an even moisture supply, supplemental watering is needed.

In some localities of the western states, there may be no rain of consequence for months on end. In these areas watering is a more readily accepted part of the lawn program than in the East, and daily sprinkling is part of the household routine.

Importance of Watering

Taking the key from the British Isles, it is obvious that grass is apt to do better if a constant supply of moisture is available to it. That means the soil should not dry severely at any time. A watering program designed to replace moisture as it is lost will be good for grass. Generalized advice so frequently heard is to water seldom but deep. That may or may not be the answer to your lawn.

Except in arid climates, it is seldom necessary to water mature grass just for the sake of keeping it alive. But carefully watered grass should be a bright green throughout the summer.

On loam and clay soils a good turf can withstand severe and protracted drouth. It may turn quite brown, but unless cut too short it will revive with moisture. Sandy or gravelly soils may dry so severely that even weeds are killed.

Some contend that grass needs a rest in summer. For a direct contradiction one has only to look at golf course putting

greens which are forced all through the summer and present a beautiful appearance year after year. If grass is fed regularly there is no reason for giving it a vacation just at the time when a green lawn is most enjoyed. With proper maintenance a lawn may well be green practically all of the year, except in long periods of below freezing temperatures.

The amount and frequency of watering depend upon the type of soil, height of cut, exposure of the lawn, temperature and rainfall.

Some soils have a greater moisture retaining capacity than others. An abundance of organic matter acts as a sponge to retain moisture and release it to the grass as needed. Silt, loam and clay soils retain water longer than sandy, gravelly soils.

Steep slopes receive less benefit from rainfall and irrigation because of surface runoff.

When to Water

The amount and type of natural rainfall are the main factors affecting the timing of the watering program. A slow, soaking rain of one-half inch will do more good than a driving downpour of several times that amount.

When rains have been missing for a week or two, it is time to examine the soil to see if it is getting too dry. This condition may develop much earlier in the spring than usually anticipated. Bright sun and brisk wind evaporate moisture quickly and may set up a need for watering much earlier in the spring than usually considered. It is not advisable to wait for the grass to show signs of withering. Once the soil gets dry to a depth of two or three inches, it is difficult to restore optimum moisture, especially if it is a heavy clay that bakes hard and cracks open.

A lawn watering program cannot be scheduled by the calendar. The need for water is best determined by occasional examination of the soil. A good plan is to cut a small plug 2 or 3 inches deep with a knife or trowel. If the upper inch or so reveals any sign of dryness it is time to water. It is easy to replace moisture to that depth but if the soil is dry much deeper, the task is more than proportionately greater.



The sure way to determine need for water is to examine the soil

Some have learned to tell by the "feel" of the lawn underfoot when it needs water. As a soil dries, it loses resiliency of damp soil and there is a marked contrast to walking over a part of the lawn that stays moist because of shade from the house as against a part exposed to full sun. This will be noted especially in one's heel prints.

Sprinkling Equipment

Manufacturers of irrigation equipment have long since outmoded the old method of "sprinkling" by sitting on a step and flicking a stream of water over the lawn with a hose and nozzle. There was something fascinating about the job but it didn't help the lawn much because not enough water was put on.

Many excellent lawn sprinklers have been developed during the past few years. The better types rotate or oscillate to deliver water in a manner resembling rain. A fine mist is not desirable because it is easily blown by the wind. A coarse stream may wash the soil and puts the water on too fast. A sprinkler that provides the effect of a slow, easy rain is best because it allows the water to soak in as it falls and not flood the ground or run off the slopes.

In selecting watering equipment the home owner should consider the size of his lawn and try to get a sprinkler which will water an area large enough so frequent moving will not be necessary. Some types cover a circular pattern, others a rectangular one. It is important to get a sprinkler that will operate satisfactorily on the pressure and volume available.

A convenient method of lawn irrigation is provided in the pop up sprinkler systems. They save time and labor and will do the job nicely if properly designed and installed.

Sometimes automatic systems are misused. It is so easy to turn on the water and leave it on that there is a tendency to over-water thereby drowning grass roots. This does no harm in light sandy soils but will be injurious on heavier soils. To be sure of complete coverage it is necessary to overlap the borders of areas covered by the spray.

Quantity of Water

As the soil dries out it should be necessary to replace only as much moisture as lost in the interval by evaporation and transpiration from grass leaves. From an average loam soil this loss on warm summer days may be 50 gallons per 1000 square feet. A six day total of 300 gallons would be the equivalent of about one-half inch rain. The length of time needed to replace the loss depends upon the sprinkler and water pressure. A good type at 20 pounds' pressure would need to run 2 or 3 hours.

In the case of a sandy soil, the moisture loss should be replaced long before it amounts to as much as a half inch of rain. While such soils absorb water quickly they hold less moisture and lose it more readily. They need to be watered more frequently, in smaller quantities.

It is easy to check the effectiveness of delivery from a sprinkler during any given time by placing coffee cans under the spray and measuring the depth of water collected. The cans should be deep enough that water does not splash out.

Watering Not a Panacea

Pouring water on a lawn in the summer will not make up for lack of plant food or other deficiencies in the maintenance program. Neither will it restore turf which has gone off-color because of fungus diseases, beetle grubs, chinch bugs, or injury from a dull or poorly adjusted lawn mower.

Special Problems

New Seedlings. While prolonged drouth does not harm unsprouted seed, germination can be hastened by regular watering. This may be advisable in order to take advantage of good growing weather. Once the seed has started to swell and burst its coat, the supply of moisture needs to be constant else the plant may perish. Heavier soils may crust over so the seedlings can't push through. In either case three or four waterings with a fine spray may be required on bright days until the grass gets a good start. But as it matures watering may be less frequent.

Shallow Roots. It is not uncommon for turf on heavy soils to suffer because of too much water, particularly following a very wet spring. In such cases the soil becomes waterlogged and the deeper grass roots die for want of air. The

grass must then depend upon the surface soil for its entire water and food supply. Unless moisture is provided at frequent intervals the grass suffers even though there is saturation within an inch or so of the surface.

To overcome this, nurse the grass along by daily watering with a fine spray. As the excess of water drains from the soil the roots will go down and watering can be less frequent.

A similar program may be necessary for grass suffering from an attack of grubs, chinch bugs or other insects. Such grass will have a weakened root structure which needs to be nursed back to health.

Tree shaded lawns lose less moisture from the surface by evaporation because of protection from the sun. The under soil, however, may dry rapidly for great quantities of moisture are taken up by the tree roots and transpired through the leaves. A medium size tree may remove as much as 75 gallons of water in one day. In such cases the water should be replaced by slow penetrating applications. Examine tree soils regularly. They may need water even though the surface is moist.



Watering may be more important in the fall than usually realized. This picture shows severe drying under a large oak tree. Actually the lawn away from the tree received enough water to stay green in a fall drought. Not so under the trees where the surface water was taken up by the tree roots to the detriment of the grass.

Fallacies About Watering



MANY PEOPLE inquire if chlorine and other chemicals used in purifying city water are harmful to grass. If water is suitable for human consumption or even for laundry purposes, it is not likely to hurt plants. It is doubtful if enough such water would ever be put on a turf to cause any appreciable concentration of chemicals. The lime in some water may tend to alkalinize soils but not harmfully except under extreme conditions.

THERE is widespread belief that to water during the heat of the day may result in "scalding" the grass. The fact is that water tends to cool rather than burn. One suggested activity in connection with summer lawn difficulties, is to spray lightly in mid-day for the cooling effect.

CAREFUL TESTS have shown that cold well water, or warm tank water will not harm grass. Even ice water or boiling water will be close to air temperature by the time it passes through a few feet of hose and is broken up into fine particles by the sprinkler before it hits the grass.

CRABGRASS, is called watergrass by many because they associate it with watering and think "sprinkling" brings it on. Actually Crabgrass will grow in drier soils than will desirable grasses but like most plants it enjoys abundant moisture and thrives on it. Fear of Crabgrass is not a valid reason for withholding water from a lawn that needs it.



YESTERDAY, we had a little picnic in the back yard using the grill and really had some delicious steaks. My friends were surprised at my performance, both as a chef and also at my ability to control insects. I mentioned your Pest Control and took an order from one of my friends who realized that the use of Scotts Pest Control would be helpful in adding to the pleasure of his back yard guests.

Dayton, Ohio

J E MINCH



Proper Lawn Feeding

Hardly one lawn in five receives enough plant food. The number of outstanding lawns in this country would increase tremendously if all were to receive the right formulation of grass food two or three times a year.

EACH OF THE MILLIONS of grass plants that make up a lawn is a living organism. It must obtain minerals and water from the soil and carbon dioxide from the air. The quantity and combination in which these are available determine the vitality, the color and density of turf.

Unlike birds or animals, a grass plant cannot go wandering about in search of food. It must take what nourishment it can find in the limited zone of soil where it makes its home.

Good feeding promotes deeper, more penetrating roots that enable grass to draw on a larger volume of soil moisture, helping it through periods of drouth.

Moss is an often-present warning that soil is becoming deficient in plant food. Lime may be needed but usually feeding is the answer.

The Right Food

The first step in choosing a fertilizer for lawns is to get one that is compounded especially to feed grass. A general flower and garden fertilizer is seldom right because it is prepared to encourage the production of blossoms or fruit. In contrast, the need in lawn feeding is to encourage green leaf growth and deep, sturdy roots.

Nitrogen, Phosphorous and Potassium are the main elements which grass needs and which are deficient in most soils. Of these, the first is of primary importance because it is responsible for the green vegetative growth that is, after all, the lawn. A scientifically prepared grass food blends the three major elements in the right proportions.

Scotts TURF BUILDER is the one lawn food, compounded especially for grass, becoming more popular every year since its introduction in 1928.



Manures and Peats. The use of manures is not as prevalent as formerly due to their scarcity but many folks still have the erroneous idea that they are the best fertilizers. Such materials provide little actual plant food. A ton of manure provides less plant food than a hundred pounds of scientifically prepared grass fertilizer. Furthermore, manures are likely to introduce objectionable weeds. The real benefit from manures and similar substances results from the humus they add to the soil, improving the physical condition. They should be incorporated thoroughly in the soil before seeding or mixed with soil to provide topdressing material.

Other materials that fall into the class of manures, from the standpoint of being good sources of humus but negligible sources of plant food, include various types of peats and mucks. Actually these call for supplemental applications of plant food since bacteria working to disintegrate humus materials frequently exhaust the soil supply.

LIME helps reduce excessive acidity but it is not a substitute for a complete plant food.

When to Feed

Feeding should be planned to produce continuing maximum lawn beauty. It is not necessary for a lawn to be off-color for more than a few weeks out of the year when temperatures are very low.

Late Winter-Early Spring feeding is advised to get grass off to a good start in the new growing season. It is the time when grass generates new roots. They can be made sturdier and more extensive by early feeding.



The Scott Spreader has been especially designed to sow grass seed or apply lawn food, evenly and accurately. With one of these any homeowner can easily do his own seeding and feeding, also weed control.

Feeding in Late Spring-Early Summer will help grass through the trying hot months. Many use the Scotts Weed & Feed combination in May or early June, get double benefits from a single application in control of broad-leaved weeds and feeding of grass.

A half rate application of TURF BUILDER is suggested for lawns in mid-summer. This can be applied safely with a Scotts Spreader if the grass is dry at time of application.

Fall feeding with TURF BUILDER helps grass recover from the effects of summer heat and drouth. It encourages lateral spread of the roots by supplying nutrients over the winter when there is important root activity even though the grass is dormant.

Special Problems

There are some conditions that necessitate a modification in the standard feeding procedure.

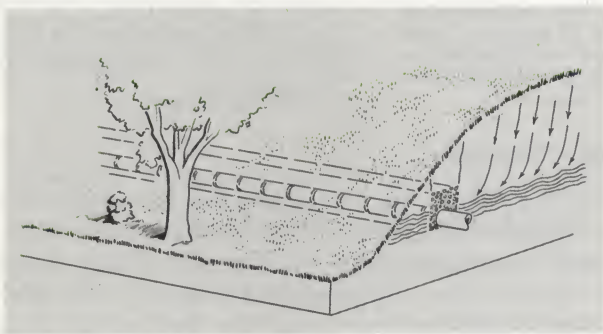
New Lawns. The incorporation of a liberal food supply in the seedbed prior to planting a new lawn is one of the best assurances for success. No matter how dark or rich a soil may appear, there is need for supplemental nutrients. Trial plantings and the experiences of lawn builders have proven conclusively that a carefully fertilized seed bed will more quickly develop a mature sod with deeper roots.

Frequently new lawns come up weak, stunted or off-color because peat moss or muck was used in soil preparation without adequate plant food. In such cases the bacteria of decay will make use of the soil supply of nitrogen to the detriment of the grass.

When seedling grass is receiving adequate moisture and still not doing well, it may be advisable to give it a light feeding. Turf Builder may be used at half rate, applied when the grass is dry and then watered in well.

Shade. Grass under trees is at a particular disadvantage because tree roots compete strongly for the limited nutrients. When one considers the enormous crop of leaves that has to be raked, the tremendous drain on the soil is apparent. It is advisable to feed grass under trees at least once a month during the growing season. This may well provide enough fertilizer to double the rate of growth of the tree and greatly help the grass too.

Miracle Chemicals have been promoted with regularity through the years with claims of fantastic results on the lawn or in the soil. One after another these have been discredited, not only in the field of fertilizers but also in hormones, vitamins, seed treatments and growth stoppers. When it comes to nutrients for grass, the complete and specific lawn food supplies all that grass needs if used in a steady repeat program.



Hillside lawns are at times subjected to seepage water that percolates down through the soil until it reaches an impervious stratum of subsoil. The water may follow this layer until it outcrops along the face of the slope. In such cases, it is advisable to install tile drainage to intercept the excess water.



The Role Of Soil Testing

MOST ANY SOIL provides a suitable base for turf growth but good topsoil is easier to work with. A gravelly or stony soil needs humus. Properly handled a stiff, almost inert clay can be made to support good turf.

The important factor in soils from a chemical standpoint is the pH value; that is, whether they are alkaline, acid or neutral. This indicates whether lime is needed to improve growing conditions. Other laboratory tests are made to measure the plant food content of a soil, such as amounts of nitrogen, phosphorus and potash. These tests, however, have little practical value since they do not show whether such elements are present in forms that can be utilized by plants.

When Tests Important. To have a soil test made involves some effort in preparing the sample, mailing it, and a nominal charge for laboratory work. This is fully justified in many circumstances of which the following examples are typical:

1. Soils of established lawns should be tested, if

The lawn is not doing well in spite of careful attention. If it suffers severe injury during short periods of extreme heat or drought.

2. Soil tests for new lawns are often made for these reasons,

Plans can be made in advance for improvement such as modification of the physical soil condition or to offset extreme acidity. Topsoil can be checked before purchase.

Getting Soils Tested. In some states the agricultural experiment station offers soil testing service at a small fee or on a complimentary basis. Soil test service is also offered by O M Scott & Sons Co at a nominal charge of one dollar for the first sample, plus fifty cents for each additional sample submitted at the same time.

The Scotts soil test includes a report describing (1) the physical condition and suggestions for its improvement as well as (2) recommendations on possible use of lime.

Better criticism of soil from established lawns can be provided if samples of sod are submitted representative of growing conditions in the lawn.

Proper Sampling

Established Turf. Use a flat spade to cut plugs of sod at least 4 inches square and five inches deep. Wrap firmly in waxed paper or aluminum foil so section reaches laboratory as it was taken from the ground. Do not moisten.

Loose Materials. About a pint of soil is required. The sample should be representative of the whole area. Take materials from various locations and mix together to make a composite sample. Do not mix soils that are conspicuously different.

Containers. Coffee cans or any tin cans holding at least a pint with tight fitting lids make good containers for composite soil samples. Freezer canisters also make suitable shipping cartons but require outer wrapping for added protection.

The use of glass jars and bottles is not advisable because of breakage.

Mailing Samples

Advise by letter the number of samples being sent, stating the lawn problem or question. If soil is from an established lawn, describe past experience in as much detail as possible. Do not place letter inside package as that would subject the entire shipment to first class postage. Instead —

1. Put letter in envelope properly addressed, carrying letter postage, and paste to outside of package.
2. Place sender's return address on package as well as the address of the laboratory. Affix stamps to package at parcel post rates.

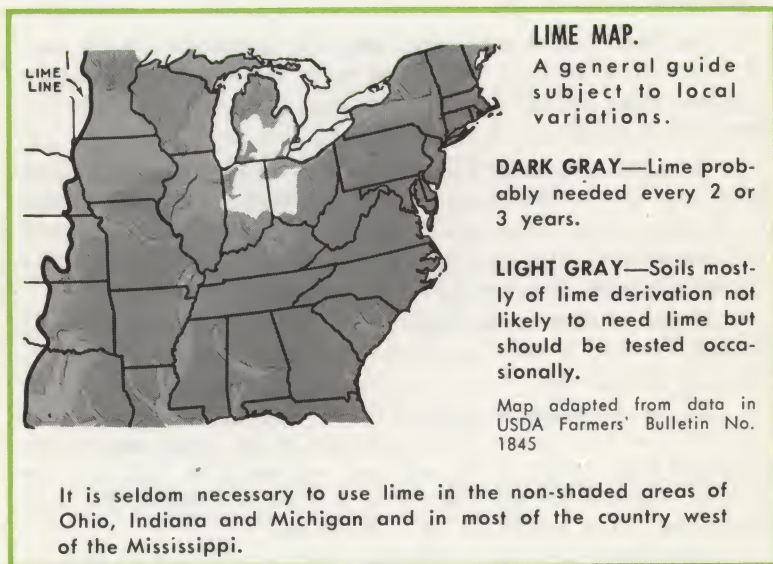
Those residing in the Allegheny Mountains or east of them or in any Jap Beetle quarantine zone should forward samples to: O M Scott & Sons Co, Cranbury, N J. All others to Marysville, Ohio.

Do Not Send Remittance with sample. A bill for the services will be sent with the report, on the basis of one dollar per sample.



Many Lawns Need Lime

IT HAS LONG BEEN OBVIOUS that many lawn soils are too strongly acid for best grass growth. A tabulation of results of Scotts Soil Testing Service over the past five years confirms this observation. As the map indicates, this overly acid condition in soil exists particularly in the eastern half of the country.



One of the interesting observations in soil testing is that soil type or texture provides no clue to whether that soil is acid or neutral. Sands, clay, loams, or any other soil type may be too strongly acid for good turf growth.

Soils are said to be "neutral" in reaction if they test pH 7.0. Above seven, alkalinity is indicated; below that acidity. The accurate determination of pH is made electronically in soil laboratory.

Indications of Acidity. If a lawn soil tests pH 6.0 or above, acidity is usually not considered a problem; if the pH is lower,

lime may be needed. Here are some of the indications of possible lime deficiencies in lawn soils:

- (a) Failure of grass to respond to fertilizer applications
- (b) Seeming lack of response to watering
- (c) Lack of color or vigor when growing conditions seem good

Some have the idea that moss indicates an acid or what they call a "sour" soil. Almost any poor lawn or soil can be described as "sour" because the adjective has many meanings. However, the presence of moss may or may not indicate a need for lime. It may appear because of lack of fertility or in a compacted, poorly drained soil. Soggy soils encourage moss, especially in the shade.

An overly acid condition may be corrected by the use of lime. A secondary benefit of lime is that it can supply needed minor elements. However, lime does not eliminate the need for regular use of fertilizer.

Benefits of liming. Lime helps make soil conditions more favorable for the growth of friendly bacteria which are needed to liberate plant food and help break down organic matter into humus. If lime is worked into the soil it may improve texture and aid the movement of air and water through it.

None of these will show up as immediate responses to liming. Instead it may be several months before any improvement is indicated.

Lime does more good if it is intimately mixed into the effective root zone of the soil, that is the upper six inches. Turning lime under is not advised because that buries it too deeply. Instead the soil should be plowed or spaded, the lime broadcast, then mixed in by cultivation.

Where a lawn is established the only choice is surface application. The disadvantage is that lime moves downward rather slowly, especially in clay soils. In spite of that fact, many cases of marked lawn improvement are traceable to surface applications of lime.

Timing. The preferred seasons to lime established lawns are late fall, winter or very early spring. Alternate freezing and thawing opens cracks in the soil to permit greater penetration of the lime.

Mid-summer is probably second choice. Some cracking of the soil may occur during dry weather to aid in penetration of the lime.

Actually lime may be used most any time. If applied during the growing season, there should be a delay of at least two weeks before sowing seed or applying fertilizer and then only if there has been an intervening heavy rain or watering.

Forms of Lime

Either (1) Raw Pulverized Limestone or (2) Hydrated Lime is suitable for lawn use. The highly caustic "Quick" lime or oxide of lime (builders' lime) should never be used.

Neither Hydrated Lime or Raw Pulverized Limestone is supposed to be caustic to the skin. However, those susceptible to dermatitis should avoid skin contact with lime, especially in presence of perspiration and friction as between the foot and shoe.

Hydrated Lime is the quicker-acting form for mixing into the soil but is not as good as finely ground raw lime.

It is best to have a soil test made to determine lime need. In the absence of this and if lime has not been used in the recent history of the lawn, the following may be used as a guide as related to the map indicating areas of lime need.

Lime Probably Needed — If lime is to be worked into the soil, use 50 to 100 pounds per 1000 square feet (20x50 ft). If a surface application to established lawns, use no more than half these amounts. Repeat every second year.

Lime Possibly Needed— Use 25 to 50 lbs per 1000 square feet. If favorable response is noted, repeat in a year or two.

Surface applications of lime should be at the lower rates and not repeated in less than six months.

How to Apply. Most lime is scattered by hand or with a shovel. The disadvantage is that such application is bound to be uneven. And results will be, too, since there is little lateral movement of the lime.

The Scotts Spreader can be used to advantage in making proper application of liming materials.

It is important that lime be kept away from acid-loving shrubs and flowers, particularly broad-leaved evergreens. The danger of lime washing from hillsides should be considered.

Too much lime is not good for grass either because it may lock up certain fertilizing elements and unduly encourage alkaline loving plants. The overuse of lime is to be avoided.

Moss in Lawns

The fact that moss is often found on neglected land, around fallen tree trunks, on the roofs of old buildings indicates it is very much at home on poor soils. Moss frequently occupies places too impoverished to support other plant life.

The presence of moss in a lawn is not of itself an indication that the soil is "sour" or acid. Lime may be needed, but usually lack of fertility or poor drainage is to blame.

If drainage is obviously the problem, it's advisable to correct the condition if possible. Regrading or fill-in of low places may be called for or the installation of underground drainage.

If moss develops because of an inadequate feeding program the answer is to rake out the moss, apply TURF BUILDER and repeat monthly through the growing season.

Moss is often seen along steep slopes where drainage would not seem a problem. True, surface drainage is good but the face of the slope may be subject to surplus water because of seepage. This is caused by percolation of water from higher ground through the soil until it meets an impervious layer. The water then follows this strata until it outcrops on a hillside and there causes a soggy condition; especially in the spring season.

In severe situations the only answer is to install tile drainage to intercept the surplus water before it seeps to the surface.

Cop Scents Foul Odor



"Twaren't hay, and 'twaren't legal, neither, so a pair of New Jersey fertilizer peddlers, whose product reportedly was not all they claimed it to be, ran afoul of the law in Bridgeport, Connecticut, according to a recent story in the Bridgeport Post.

Hoping to make their usual easy and fruitful sales to an unsuspecting victim, the men accidentally called at the home of a police sergeant. Scenting trouble, he called headquarters, had the peddlers taken in custody for peddling without license and fraudulent misrepresentation.

The investigation disclosed that the "fertilizer" was the usual tired, worthless "humus" that the first wind drives away — a racket exposed in LAWN CARE a dozen times.



Control of Weeds — Non-Grass Types

PROBABLY the simplest definition of a weed is: "Any plant growing out of place". Thus a garden plant springing up in the lawn is a weed, as is the finest grass in a flower bed.

Dr E R Spencer, author of an excellent book on weeds, says: "Of all the forms of nature... nothing is so sure to come into one's life as weeds". Some folks feel that in this respect their lives have been full indeed.

In lawns, certain grass plants are just as obnoxious as dandelions, buckhorn, plantain or daisies. Thus the subject of lawn weeds necessarily includes grass-type weeds as well as the broad-leaved plants which are more commonly considered weeds.

Now it is possible to clear a lawn of most unwanted growth — grass weeds as well as others — by easy applications of chemicals. Moreover, this can be accomplished without permanent injury to the desirable lawn grasses:

Modern science is responsible for the development of selective weed controls. One type of chemical is effective



Volunteer growth of weeds, clover and grasses. No seed was planted. This mess sprouted from dormant seeds in the soil in the matter of a few weeks in the spring.

against most dicotyledons (*plants emerging with two leaves*) but has little effect on monocotyledons (*one leaf, e.g., grains*). Clovers and most garden plants are "dicots". Grasses, desirable and otherwise, are "monocots". The dicots are successfully eliminated from lawns because a dosage of dichlorophenoxyacetic acid (2,4-D) that proves their undoing is relatively harmless to grasses.

The selective action of a very minute amount of 2,4-D is its most startling feature. Large, healthy dandelions and other susceptible weeds disappear in a few weeks while surrounding grass remains unharmed.

In its early development this nemesis to lawn weeds could be applied only as a spray. Admittedly this was a great advance over hand-digging both in effectiveness and in labor saving. However, the extra work of carrying water, pumping up pressures and the need for specialized equipment stimulated Scotts Lawn Research into developing selective control for broad-leaved weeds in two easily used dry compounds.

- 1) 4-XD — *a clean, granular free-flowing weedicide*
- 2) WEED & FEED—*combining the same effective weed control with a special fertilizer to simultaneously stimulate the grass*

Either product is quickly applied with the same convenient two-wheeled spreader used for seed sowing and fertilizer applications.

Effects Are Good

Practically any lawn can be cleared of dicotyledons with



no injury and little or no discoloration to the grass. A good time to do this is during periods of active weed growth except in very hot and humid weather.

The dicot weeds vary in their resistance to chemical weed controls. Clover is one of the more resistant species. Generally it is not destroyed but growth is retarded, particularly its tendency to bloom. This is considered an advantage because profuse blossoming is one of the

serious objections to clover in lawns.



**Clinging 4-XD particles
mean goodbye to weeds!**

Resistant Weeds

Some plants are more resistant to the action of the 2,4-D chemical. The list includes the low growing, vining type of weeds such as chickweed, speedwell, trefoil and ground ivy. Usually they require repeat applications in warm weather at 3 to 4 week intervals.

Wild garlic or wild onion infestations are reduced substantially if application is made in *late winter*, about the time growth emerges, with a follow up in two or three weeks.



Authorities recognize the value of feeding grass at the same time weed control is used. This strengthens the turf, enabling it to fill out and take over where the weeds had been. Lawn food can be put on separately although the more convenient plan is to use Scotts Weed & Feed which does a simultaneous job of feeding the grass as it clears out broad-leaved weeds.

Where weed stands were heavy it may be necessary to sow seed to fill in the bare ground. If the soil is reasonably moist, it is safe to sow seed a week after applying chemical weed control.

May Be Slow

Susceptible plants begin to show the effect of 2,4-D within a matter of days — if growth is active. On the other hand if the weather is cool or the soil dry, little effect may be noted until good growing conditions prevail. At times weeks may elapse

before the weed destruction is evident. The action of an application may be delayed but is not apt to be lost.

Weeds Ever With Us

The illustration on page one of this chapter exemplifies the spontaneity and longevity of weeds. The growth is all volunteer, covering a period of a few weeks. Nothing had been added to this good garden soil, which had been under intensive cultivation the previous year.

These volunteer weeds came from seeds in the soil which obviously were over a year old. As a matter of fact, agricultural research has proven seeds may live in the soil 50 years or longer.

The weed population of soil for a new lawn can be reduced materially though not eliminated by fallow cultivation. This means letting the weeds grow, then raking, harrowing or disking to destroy them before they mature seeds.

Even a full season of such treatment will not result in the sprouting of all weed seeds in the soil. Some seeds are endowed by nature with unusually hard coats that may for years resist entrance of moisture. Others require alternate freezing and thawing to break the seed coat.

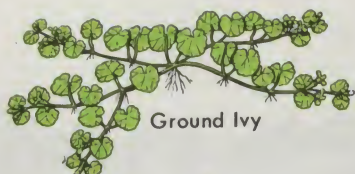
Farmers tell how certain weeds show up unexpectedly every twelve to fifteen years without apparent rhyme or reason. The same thing has been noticed in turf areas. Even where the soil has not been disturbed, new weeds appear although such growth had been controlled in the lawn the previous year.

Not Screened Out. Sometimes weeds are introduced and at a high price. Manures, topsoil, native peats, black dirt — any of these will carry a substantial weed seed content just the same as any object will carry germs. Frequently the claim is made that these materials are weedfree because of screening, but this is not true because most weed seeds are so tiny that they will slip through any screen that would pass soil particles.

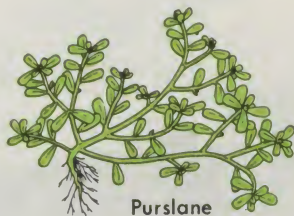
It is possible to sterilize soil to kill weed seeds but it is seldom done because of the great expense involved in heating soil to temperatures of 200 degrees F. and keeping it there for at least a half hour.

Chemicals may be used to destroy weed seeds in soil that is under cultivation such as in new lawn preparation. Several weeks time must elapse before seed can be sown.

Some of the lawn weeds (dicots) that can be controlled with the dry formulations of 2,4D.



Ground Ivy



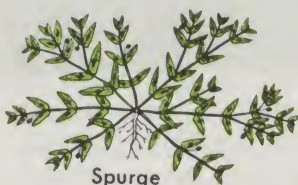
Purslane



Henbit



Chickweed



Spurge



Dandelion



Plantain



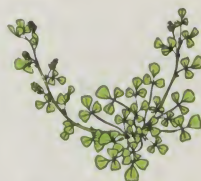
Sheep Sorrel



Buckhorn



Knotweed



Black Medic

Cool Green Grass Soothes The Weary Traveler



SOME 53,000 MOTELS dot today's American landscape. Competition is keen and operators in this skyrocketing business are constantly seeking unique ways to attract the tourist.

More and more motels are adopting a simple and effective business builder—a good lawn. Well groomed grass has a universal and basic appeal.

After a tiring day on the road, a cool green lawn extends a welcome that says “it’s nice inside too.” One LAWN CARE reader kindly shared her experiences with these words.

“Last summer while traveling through the West, we were looking for a place to stay in Grand Junction, Colorado. We chose a motel for its attractive appearance, one with a pretty lawn and attractive flowers. The lawn was like a green carpet without a weed.

“When I asked the manager what made his lawn so wonderful, he said, ‘it’s a Scotts lawn.’”



Control of Weeds — Crabgrass

Crabgrass

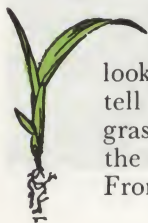
OF ALL OBSTACLES to good lawns, Crabgrass is probably Enemy No. 1. Crabgrass is strictly annual, volunteering from seed as the soil warms in late spring or in the summer. Unless checked, its claw-like spreading tentacles will crowd out desirable grasses and take possession by mid-summer. Crabgrass then shoots off ugly wiry seed heads that are extremely difficult to mow. The first heavy frost finishes the plants but before that time, millions of seeds will have been dropped to germinate another year.

The chemicals controlling non-grass weeds such as dandelions will not selectively control grass weeds. Some years ago, however, scientists at the University of Rhode Island noted that some forms of mercury had the ability to select between grasses. They established the fact that certain dosages, properly administered, would prove the undoing of Crabgrass without permanent injury to desirable grasses.

Scotts Lawn Research developed a practical commercial product, given the name of SCUTL. On the market since 1950, it has been proven as the easy-to-use answer to the Crabgrass problem. It is a dry, granular compound, quickly applied with the same spreader used to sow seed or to distribute fertilizer. SCUTL can do a thorough job if properly used. In a sense it is a lawn medicine and like most medications, one dose is not enough.

Knowledge Is Power

To conquer Crabgrass, it is necessary to understand its habits of growth and to be able to recognize it in its early stage of development. A few innocent looking sprouts of light green, stubby grass may foretell trouble in a lawn. The sketch represents Crabgrass in the two-leaf stage, the beginning of one of the slickest subversive operations in the plant world. From one of these sprouts a plant spreading out as



much as two feet may develop almost unnoticed within a period of ninety days.

Crabgrass has different names in various localities. There are many varieties, mainly of the genus *Digitaria* or *Syntherisma*. Other English names in common use are *wiregrass*, *water-grass*, *finger grass*.

Control. The procedure for control of Crabgrass will depend upon the season or progress stage of the pest when the campaign against it is begun. As with most things, the earlier start is better but if Crabgrass is growing in a lawn, the time is "Now". The weapon is SCUTL and its strategic use in three different situations is outlined below:

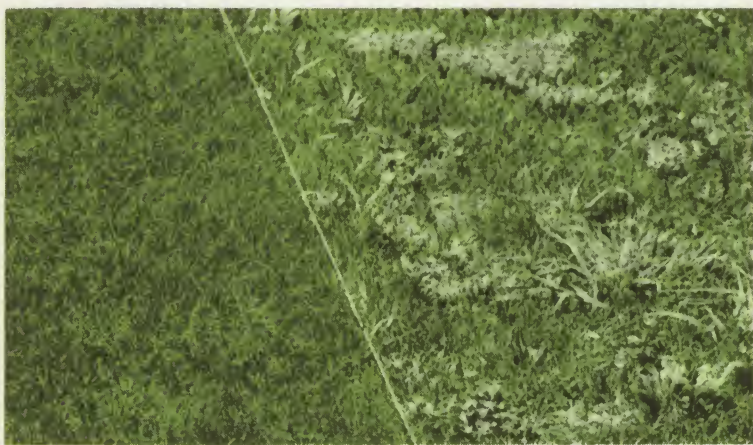
1. Late Spring

The control action of SCUTL affects either the plant or the germinating seed. It is possible to forestall later trouble by having SCUTL on the ground so the sprouts of Crabgrass pick up a lethal potion as the first leaf emerges. The timing will depend upon when the soil is subjected to a couple of weeks of real warming sunshine. This is usually about the time apple trees and lilacs are blossoming and late tulips are in their full glory.

A total of five or six easy spreader applications are made at intervals of two to three weeks. Some varieties of Crabgrass may germinate after this program, necessitating a clean-up treatment in mid or late summer.

2. Summer

If the late spring program has not been carried out, Crabgrass will be growing actively by the time rambler roses



Late Spring SCUTL-ing made the difference



Beginning Crabgrass Invasion

have bloomed and summer seems definitely at hand. Some are fooled by Crabgrass in its early stages because the bright yellow-green sprouts are not ugly, though the leaves are broader than desirable grasses.

By mid or late June the spreading and branching phase of Crabgrass is usually under way. Since growth is tougher and

more rapid in hotter weather, the interval between applications in this program is 5 to 7 days.

After the second application in this series, a distinct yellowing followed by browning of Crabgrass plants will be noted. If this does not occur, then some variety other than Crabgrass is the lawn culprit. The list of summer annual grasses which are not controlled by chemicals includes: Fox-tail, Goose Grass, Witch Grass and Dallis Grass (*Paspalum*). If in doubt whether your problem is Crabgrass, send a specimen for identification to Scotts at Marysville, Ohio; Cranbury, New Jersey; or Palo Alto, California. Wrap in foil or wax paper to prevent drying but do not moisten plants.

3. Late Summer

The real orneriness of Crabgrass may not be recognized until late summer when it sends out reddish or purplish seeding spikes that are wiry and extremely tough to mow. By then Crabgrass will have smothered much desirable grass but even so control efforts are very much worthwhile. Future trouble may be lessened by preventing further spread and seed development, but quick action will be needed if Crabgrass has grown unchecked into August.

The late season SCUTL- ing is at 5-day intervals to damp vegetation.



Scutl particles on matted Crabgrass plant

Frost Kills

Unless intercepted, Crabgrass grows vigorously until killed by heavy frost. Before that time, each plant matures thousands of seeds that fall to the ground to set a crop of succeeding years. Accordingly it is doubly important to stop Crabgrass as soon as it is noticed, to (1) *limit the engulfment of the lawn by Crabgrass*, and (2) *prevent production of Crabgrass seeds*.

Some Crabgrass seeds remain alive but dormant for many years, so it is not possible to gain complete control in one year. *However, since most Crabgrass comes from seed dropped the previous year, reduction of the crop can be as much as 90% the second year.* If that is taken care of and no new Crabgrass seed introduced, there should be little or no Crabgrass the following season.

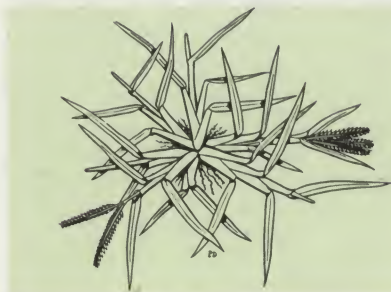
Other Grass-Type Lawn Weeds

WHILE SELECTIVE chemical controls for Crabgrass have been used successfully for several years, no such success can be reported for various other weed grasses, most of which are annuals. Many resemble Crabgrass so closely in appearance and habit of growth that cases of mistaken identity are common.

The early spring program with SCUTL will catch some of these grasses if it is applied to the lawn before these weeds sprout. Such method is referred to as pre-emergence weed control, and requires a series of treatments starting in dandelion blooming time in late spring. This is the Late-Spring program prescribed for Crabgrass Control.

Goosegrass

Goosegrass (*Eleusine indica*) is often confused with crabgrass. It is also known as Crowfoot Grass, describing its



flat, fingered seed stem arrangement. In some localities the name "Silver Crabgrass" is given this intruder though there is no family connection. Goosegrass, a self-seeding annual, appears later in the summer than crabgrass but once started makes very rapid growth.

Goosegrass develops into a flattened rosette from a single fibrous root system. Its flat stems are light silver-green. The

finger-like seed bearing spikes are similar to but coarser than those of crabgrass.

Its clustered growth makes Goosegrass easy to hand-cut with a sharp knife or destroy with a drop of crude acid though this must be used with extreme care to avoid personal injury. The seeding habit is so prostrate that it is next to impossible to cut off the seed heads by raking and mowing.

Goosegrass is often a problem in poor soils subject to heavy foot traffic. A feeding program is essential before it can be replaced with desirable grass varieties. Overcoming soil compaction is also beneficial in the elimination of this annual.

Foxtail

Foxtail is a name generally applied to two grass groups, *Alopecurus* sp., mostly perennials, and *Setaria* sp., largely annuals. There are over sixty different grasses in these two groups, some common names being Pigeon Grass, Bottle or Bristle Grass, because of the similarity in their tightly clustered seed heads with greenish yellow bristle.



FOXTAIL

The annual Foxtail species sprout a few weeks earlier than crabgrass and are apt to be especially harmful in spring-seeded new lawns. Foxtail is less often a pest in well established lawns except in the Great Plains states where the seeds may be deposited in large quantities in dust or sand storms. Seeds of Foxtail species are distributed pretty liberally in

soils throughout the country except in the extreme north.

Control. Prevent seeding by raking and mowing. Pre-emergence use of SCUTL will help if applied before Foxtail germinates in late spring.

Witchgrass

Witchgrass (*Panicum capillare*) is typical of the Panicum family of lawn invaders. They are annuals. The wide leaves and stems are covered with rather long hairs so it isn't difficult to distinguish it from crabgrass. Its seeding stem is quite open, botanically described as a large spreading terminal panicle.

Control of Witchgrass is in regular mowing to prevent seed production. Witchgrass is not often a problem except in the first summer of a new lawn.

Poa Annua

Poa annua grass shows up in some lawns about as early as the first spring crocus. It is a soft, bright, yellowish green grass, rather attractive in the early season.



The unusual characteristic of Poa annua is its ability to bloom and produce seed even where closely cut. The seed heads are of a distinctly whitish cast. Poa annua has a tendency toward growing in patches which are unsightly at seeding time and leave bare ugly spots as the plants disappear in hot weather.

Poa annua is easy to identify in the blooming stage. It is low growing, seldom three inches high. Seed is scattered in mowing and raking and is transported on shoe soles.

POA ANNUA

There is no commercial supply of seed of Poa annua due to the difficulty of harvesting such short growth. Some folks are interested in propagating it because it makes a fine turf while it lasts and may thrive in densely shaded locations where other grasses fail.

Control. The only specific control is prevention of seeding. Some success is had in burning out patches before seed has matured, using a blow torch or a spray of kerosene.

At times Poa annua takes over because the soil is too wet or too compact to support a healthy growth of desirable grasses. Correction of this condition may give the other grasses a better chance. Whenever Poa annua appears, the area should be liberally fertilized and desirable grasses planted so good grasses can come in as the Poa annua succumbs to hot weather.

Nimble Will

Text books do not divulge why a grass should have such an odd common name as Nimble Will. Another designation is



NIMBLE WILL
(*Muhlenbergia schreberi*)

“Drop-Seed grass” descriptive of the seeding habit. The spikelets flower in numerous dense panicles terminating the branches. The husk closely enfolds the seed until ripe, then drops to the ground with the seed.

Nimble Will is neither conspicuous nor objectionable until it develops sufficiently to spread out and occupy quite a patch in the lawn. Then it will be noticeable because of unattractive blue-

green color of its leaves and the brown sheaths at the base of the stems.

While Nimble Will has definite spreading characteristics, the spread is mainly in one direction, giving the patches a definite nap. If the leaves are brushed in a direction opposite to that of growth, the ugly brown sheaths are particularly conspicuous.

Nimble Will turns an ugly, bleached gray after heavy frosts and does not green up until late the following spring. Nimble Will need not be confused with crabgrass since it does not flatten against the ground like the latter. Nimble Will is also distinctive for the easily felt "knots" along the stem where leaves and new stems develop.

Control. Hand pulling or raking patches of Nimble Will is suggested, taking care to get as many of the branching stems as possible. Immediately reseed such areas.

Patches may be burned out with flame or smothered with tar paper. Another possibility is to cut out the sod to a depth of two inches and replace with good sod, possibly some taken up from edges of flower and shrubbery beds.

Quackgrass and Johnson Grass

Years ago some well meaning person introduced Quackgrass as a hay, pasture and soil binding variety. A closely related species called Johnson Grass was also introduced into the South. Ever since, farmers and others have been fighting these two grasses in cultivated fields.

Johnson Grass of the South is hardly ever a lawn pest. In contrast Quackgrass may be in the North, especially in new lawns just struggling to get started. Quackgrass is more aggressive in the northern tier of states and into the lower provinces of Canada.



Showing spreading fleshy rootstalks typical of Quack or Johnson Grass. A new plant may develop from each scaled joint. These grasses are perennials.

Lawn Invasion of Quackgrass may go unnoticed for a while. In early growth its appearance is not too bad. The leaves are a bit wider and tend to take on an ashy-green color. They are rough on top, smooth underneath. Eventually patches of Quackgrass are conspicuous because of bluish-green color, coarse, ugly growth, with much browning underneath.

Control is accomplished by starving the roots. This is not easy although in time regular close mowing seems to eliminate Quackgrass in lawns. A quicker method is to cover infested areas with tar-paper or other material that will exclude all light. Even this method may take two or three months since the fleshy roots have substantial food reserves.

Theoretically Quackgrass can be eliminated by cultivating infested areas, eliminating the roots or exposing them to the drying sun. Complete removal is difficult because the roots tend to break and any live joint in contact with soil will start a new plant.

Quackgrass is often introduced into lawns in soil brought in from farm areas. It is a good idea to examine such soils for the possible presence of the tell-tale whitish, sharp-pointed fleshy roots with the scaly joints.

Chemical Controls are being used to some extent, including Ammate, TCA and Dalapon. These chemicals should not be used in the vicinity of tree roots. Generally Quackgrass or Johnson Grass infestations in lawns will gradually disappear without the necessity of drastic chemical treatment.





Hot Weather Troubles

MID-SUMMER may be a trying period for lawn owners. The weather may be extremely wet or extremely dry. Insect pests and grass diseases may be troublesome, especially in the better lawns.

Where summer turf injury is observed, it is advisable to reflect on the weather of the preceding weeks, check soil moisture and look for insects.

Too Much Moisture

The effect of not enough rain is usually obvious but it is not so easy to distinguish the effect of surplus moisture. The initial effect of too much water in a poorly drained lawn may be a yellowing of the grass. A soggy soil prevents air from reaching the roots and they suffocate for lack of oxygen. Saturated soil is also destructive to friendly soil bacteria that make minerals available to the grass.

When soil is saturated the deeper roots are drowned and the grass is left with only a shallow root system. Then a brief interruption in the supply of moisture places the lawn in a most vulnerable position, because the surface soil dries quickly and no deep roots are alive to get the lower-lying moisture. This produces the paradox of grass in an over-watered soil dying because of a lack of moisture.

As soon as a shallow rooted situation is discovered, it is advisable to nurse the lawn back to health by daily watering with a fine spray. As the excess water drains from the subsoil, the grass roots will begin growing downward again. Then sprinkling should be less frequent and more thorough until a normal moisture condition is restored.

Turf Diseases

Though few realize it, various fungus diseases take quite a toll of grass. Often the injury is only scattered and the results simply a thinning of grass that may go unnoticed. At other times conspicuous brown patches develop though not all browning of grass is caused by disease.



Certain forms of mercury provide the best protection against grass diseases. One of these mercurials is an important component of SCUTL, the Crabgrass control. More and more, SCUTL is coming into use as a general "Lawn Treatment". Regular applications begun in late spring curb grass diseases. The same series of SCUTL treatments will stop annual weeds such as Crabgrass before they can emerge from the soil.

Leaf Spot. The activity of the *Helminthosporium* fungus causes the grass disease known as Leaf Spot. It is one of the first injuries to be reported following a wet spring season. When Leaf Spot attacks, the grass does not immediately disappear though it does develop lesions, brownish centers merging into black edges. This trouble can be forestalled by utilizing the fungicidal activity of SCUTL in the late spring series described above.

Brown Patch. The disease Brown Patch causes some grass to turn brown during the summer months. The responsible fungus, *Rhizoctonia solani*, is present in soils and on vegetation everywhere. It is usually inactive except during periods of hot, humid weather when grass is in a weakened condition.

The first evidence of Brown Patch is a whitish smoke ring blight followed by wilting and blackening of the affected grass as the disease continues. The attacked grass turns brown in ever widening patches roughly circular in outline. Unless the disease is very severe and long lasting, only the topgrowth is injured.

Lack of good air circulation makes grass more susceptible to Brown Patch so it often hits lawns surrounded by a dense growth of trees or shrubs or in other locations of poor air drainage.

In many cases Brown Patch can be prevented by remedying the factors responsible. If this is done and the disease is still troublesome, regular applications of SCUTL are suggested at two-week intervals.

Damping-Off. When a stand of seedling grass is spotted with dead, brown patches varying from one to four inches in diameter, it is likely that Damping-Off has occurred. Sometimes this fungus disease kills the seed sprouts just as they emerge, but before they have become large enough to be noticeable, making it appear that the seed germination was faulty. At other times the disease comes after the grass is well started. The young grass turns dark at the base as the blades seem to melt together, then wither and turn brown.

Although not mentioned so often as responsible for seedling failure, it is probable that Damping-Off causes more injury to new lawns than any other factor except lack of moisture. This is particularly true in hot, humid weather.

The use of chemical seed protectants has been advocated to forestall possible fungus injury to grasses during the germination period. However, it has not been demonstrated that such treatment is needed for seed of good growing ability.

Fungus attack on seedling turf, such as Damping-Off, is one of the hazards of nature for which there is no clear cut remedy.

Algae. It is not uncommon to find a green scum on wet lawn soils. This growth is caused by Blue-green Algae. When conditions are favorable, the scum may make such a growth as to form a tough parchment-like coating over the ground which the grass cannot penetrate. One or two SCUTL applications will usually stop the growth of Algae.

Mildew. At times a nice stand of grass suddenly takes on an appearance of having been dusted with flour. This is Powdery Mildew, similar to the mold that grows on old shoes left in a damp place. Fortunately, Mildew causes little real damage and soon disappears.

Slime Mold. There are many different species of Slime Molds, all of which produce types of spore-forming masses. Certain species appear as small capsule-like spore colonies

growing upright from the surface of the leaves. They are steel gray in color, later changing to black, giving the affected grass the appearance of having been dusted with soot. Injury from Slime Mold is insignificant so control treatments are unnecessary although SCUTL will usually stop it.

Fairy Ring. The toadstools of this fungus develop in bands as segments of circles varying from 2 to 4 feet in diameter up to 30 or 40 feet.

When the surface growth of Fairy Ring dies back, some of the grass within the band is destroyed while the grass bordering this pattern seems to be benefited. The use of SCUTL as suggested for toadstools may curtail the fungus activity causing the phenomenon of Fairy Rings.



Toadstools. Toadstools and Mushrooms frequently sprout in lawn areas during wet periods because of an excess of coarse, decaying organic matter in the soil. Sometimes regular mowing will eliminate these pests. If not, the soil around the infested spots may be forked or spiked to permit penetration of SCUTL which usually stops further growth.

Good Lawns Have Cash Value



*M*AURICE J HALL of Flint, Michigan, writes: "Four years ago I bought a home in a new subdivision. The lawn was supposed to be finished, but it was a mess. I picked up a Lawn Care pamphlet which interested me and had myself placed on your mailing list. That fall I tore up my so-called lawn and planted Scotts Seed. I got a wonderful catch and since that time with a minimum of effort have had a beautiful lawn, so much so that it has been like a green oasis in a desert of poor lawns.

"This spring because of a sinus infection, I decided to sell and move away. Regardless of the fact that two other homes in the same block have been for sale for sixty days and still are, my home sold in eight days.

"The three homes are very similar yet I received \$1000 more than one is asking and \$1500 more than the other. The prime difference among the homes was the lawn. I firmly believe my house sold because of the lawn."





Grass—Nature's Air Cooling



A GOOD LAWN, from the standpoint of summer comfort, is a thick, heavy turf that keeps the soil cooler and reduces the carry-over heat from daytime into the evening hours. Tests have shown that grass-covered terraces in full sun can be 20 degrees cooler than adjacent paved areas.

Of course, the better the turf, the cooler the lawn. The right program of summer care pays off in delighting the eye, increasing property value and in providing the cool, relaxed atmosphere that is "so nice to come home to." Certainly those who must tramp the hot city streets during the day are entitled to enjoy the exhilaration of walking in the cool, soothing grass in their bare feet.





Control of Beetle Grubs and Earthworms also Moles, Skunks and Raccoons

DURING THE PAST forty years many turfed areas in the northeastern portion of the United States have been ruined by the grubs of various beetles. The greatest damage is by the grubs of those beetles having a one-year life cycle, namely, the Japanese, Oriental, and Asiatic Garden species. Grubs of May Beetles are less troublesome since they propagate in a three-year life cycle.

Turf damaged by grubs may first appear to be suffering from lack of water or from an overdose of fertilizer or weed control. The grass turns brown and dies in irregularly shaped patches. The sod is severed at the roots so that it can be rolled up like a carpet to expose a colony of feeding grubs.



Grubs of Jap Beetles cut off grass roots just below surface so that sod can be lifted up like a carpet. Grubs are of light cream color, usually curled in blunt crescent shape, $\frac{1}{2}$ to $\frac{3}{4}$ inch long. Note comparison in size to man's fingernails.

If a period of severe drying follows grub activity, the lawn may be completely lost or the grass so weakened it is vulnerable to weed invasion, especially Crabgrass.

The presence of grubs is often disclosed by flocks of birds scratching up the sod to get at the juicy food morsels.

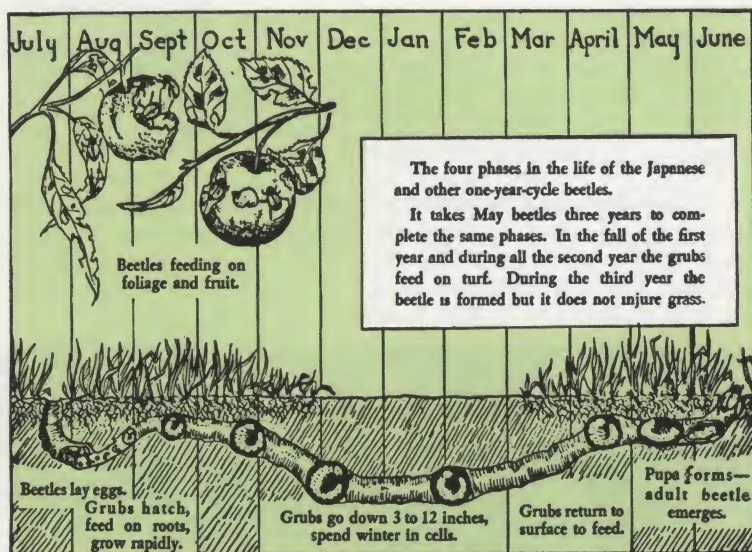
Beetle larvae are also a favorite food of moles, skunks

and raccoons. Moles make burrows and the others tear up the sod, not to eat the grass but to be able to feed on the soil-borne

grubs. Moles and skunks will forage elsewhere for food after grubs and their ilk have been eliminated.

Jap Beetles

The four phases (*egg, grub, pupa, beetle*) in the life of Japanese and similar beetles are typically completed in one year as illustrated in the chart.



Infested Localities. Since the Japanese Beetle was discovered in New Jersey in 1916, it has spread steadily, advancing 5 to 10 miles a year. It is thought to have been introduced around iris roots from Japan. The natural migration of Jap beetles has been sufficient to infest practically all of the Atlantic Seaboard from southern Maine to Norfolk. Inland it has extended through most of New England, New York, Pennsylvania, Maryland, Virginia, West Virginia and eastern Ohio.

Aside from the natural spread, Jap beetles have been accidentally transported to the west and south of the main infestation areas. They have become serious pests around Cleveland, Cincinnati, Detroit, Indianapolis and St Louis.

May Beetles

The life cycle of the May beetle is typically of three years' duration, although the one-year species is becoming more prevalent.

From April to June of the first year May beetles are found feeding on a favorite food such as oak leaves. They mate at night, the female returning to the soil to lay eggs which hatch in three to four weeks. The resulting grubs live on organic matter and roots until cold weather when they hibernate for the winter. They remain in the ground all through the next year to emerge as adult beetles the third year.

The May beetle is found in almost any state north of the Ohio River and westward to South Dakota. May beetles appear every summer because different broods mature in different years.

Control of Grubs

Until recently about the only control for grubs was to poison the soil with lead arsenate. This was fairly effective for short periods but had the drawback of requiring the handling of a virulent poison.

Some of the newer insecticides such as Chlordane are quite effective against grubs and are included in the SCOTTS LAWN CARE product for control of pests.

In areas of known infestation, it is a good idea to grub-proof the soil before seeding a new lawn or turf area. The selected insecticide is worked in during the final stage of soil preparation, along with fertilizer.

Earthworms in Lawns

THE ROLE OF Earthworms in helping produce the fertile topsoil of this planet is of the utmost importance. These underground burrowing night crawlers, angle worms, fishing worms or whatever you call them, are generally friendly to man.

One place they are not appreciated is on lawns and putting greens where they leave casts. These tend to dull mowers and smother grass as they are packed down.

Since the burrowing of earthworms improves water and air drainage in heavy soil, it does not seem advisable to discourage their activities unless the damage is quite severe. Us-

ually the appearance of casts is only for a limited time and the possible harm can be nullified by sweeping or brushing the area to scatter the casts before mowing.

If they must be discouraged, the pest control suggested for grub infestations will do that. Repeat applications may be needed since earthworms are endowed by nature to live with most anything in the soil. A build up of Chlordane, however, should at least keep them from extreme activities near the soil surface.





Control of Ants and Other Insects

ANTS do not directly harm garden plants or grasses although some species having very strong jaws are able to crack seeds and appropriate them for food. It is the earthen mounds thrown up about the entrance to their nests that make the presence of ants undesirable. Besides being unsightly, the mounds sometimes smother young plants. The galleries or burrows which ants form in the soil disturb root growth by causing undue drying.

While ants do not feed on plants they are garden pests because of their habit of fostering aphids (plant lice). Some species get part of their food from the sweet, sticky excreta of aphids. This is so important to them that they carry the aphid eggs underground in the autumn and protect them over winter. In the spring they carry the young aphids to a succulent plant host for a food supply, later moving the adult aphids to still other "pasture." Some types of aphids have become so dependent on ant transportation that they have practically lost independent means of locomotion.



It may surprise some to learn that there are kings as well as queens in the ant colony and that in their early life they have wings which they use to emerge from the nest. The males mate and soon die, the females fly to attractive nesting sites, tear off their wings, make nests and lay their eggs. The queens live a dozen years or more during which time each lays thousands of eggs.

Control Measures

The chemical Chlordane effectively controls ants. It can be made into a solution and poured into the burrows or simply broadcast over an infested area.

A convenient dry formulation of Chlordane is marketed as one of the Scotts Lawn Care Products. This is easily broadcast over any outdoor area where ants are a problem such as in the lawn, flower garden or around the garbage can.

Poison Baits can be used to diminish the ant nuisance both indoors and out. Such baits should attract both sweet and grease-eating ants. There are two kinds of poison baits. One lures the ants into a trap from which they cannot escape. Another bait contains slow acting thallium sulphate poison which is carried back to the nest and fed to the queen and her young. This is better poison for outdoor use since it would be difficult to trap enough ants to have much effect on a full colony.

Where ants are a serious problem because of invading the house from the yard, an insecticide barrier around the perimeter of the house may keep them out. The granular form of Scotts Pest Control is easy to use for that purpose.

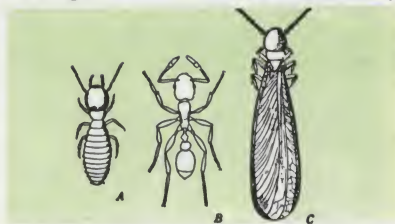
Termites

Termites resemble ants and are sometimes mistakenly referred to as flying ants, winged ants or white ants.

At times swarms of these may be seen emerging from nests formed under a lawn. The termites with wings are the true males and females. The soldiers and workers do not have wings. The workers are the destructive forms which are active in foraging and feeding on wood.

Because termite damage to wood is so much to be avoided it is important that every home owner be able to recognize them. The accompanying illustration may aid in identification. The main difference between wingless termites and ordinary ants is that termites do not have the slender waist typical of true ants. The wingless termite workers are white and always work under cover.

If a colony is located it should be promptly destroyed by one of the methods suggested for ants.



A, adult form of termite, the kind that destroy wood; B, a true ant with the slender waist; C, winged form of termite.

Chinch Bugs

SOME LAWN PESTS are easily detected before they cause any damage. But Chinch Bugs are so small they may work away undetected until sufficient brown spots appear to make it obvious something is wrong. If Chinch Bugs prove to be responsible, quick action is called for.

Chinch Bugs are no strangers to American farmers. There is one species attacking grains and other farm crops but injury to lawns in the North is the work of a particular variety called Hairy Chinch Bug (*Blissus hirtus* Montandon). They are tiny insects measuring less than $\frac{1}{4}$ inch from tip to tip, even when full grown. The body is black, the wings white with black markings. Some have long folded wings the full length of the body, others have short wings extending about half way back. They are clasped tightly against the body and not used for flight. Migration through the lawn is accomplished by crawling. The young bugs are extremely small, have no wings, and are coral or reddish-brown in color, darkening as they grow.



Showing the long winged and short winged forms of Chinch Bugs. Under the glass they are magnified about 5 times. Actually they are practically gnat size.

Chinch Bug activity is greater some years than others because more of the adults live through an open, dry winter than one with lots of rain and snow.

The adults surviving winter lay eggs on grass stems in the spring. These hatch in late spring or early summer when days are consistently warm and sunny. The new brood of Chinch Bugs start feeding on grass as they attain full growth in a matter of days. In mid-summer the spring generation continues the cycle of laying eggs. This second generation feeds on the grass in late summer and then hides in leaves and other debris over winter to start the cycle again the following spring.

In order to get sustenance to grow to maturity, the Chinch Bugs pierce grass stems and suck out the plant juices. If enough bugs attack a plant, leaves turn brown and roots may die. Generally, plants can be saved if early first aid is applied.

When To Expect Them

Chinch bugs seem to prefer operating in a relatively thick turf as there the grass is more succulent and the heavy growth gives them a good place to hide. They are not active in shaded areas feeding only in full sun when the temperature is 70 degrees F. or over and the grass blades dry.

Chinch Bug damage at first appears as irregular spots of dead grass scattered through the lawns. If their activities are not checked by a change in weather or a control treatment they continue to spread out into live grass until large areas are affected.

Turf injury by beetle grubs may be confused with that of Chinch Bugs. Grubs sever grass roots whereas Chinch Bugs only suck the juices and the plants remain whole and firmly anchored to the soil. Sod Web Worms sometimes attack grasses but they actually cut off blades very close to the ground.

In humid, sultry weather, brown dead-looking spots may appear in turf as the result of fungus diseases. This is not the kind of weather when Chinch Bugs are normally destructive.

Heat and drouth may of themselves cause grass to turn brown, but then the lawn is uniformly affected and not in scattered patches as is the case in Chinch Bug attacks.

Finding Chinch Bugs

Since they are so small and so adept at hiding under the crowns of the grass plants, Chinch Bugs are very hard to locate. If they are suspected the search should be made in the heat of the day in bright sunlight. They are more apt to appear in numbers in the live grass at the edge of the browned areas. It is a good idea to get down on the hands and knees and part the grass for close inspection.

One way to spot them is to place a piece of white cardboard next to a suspected invasion. If the hand is brushed quickly through the adjacent grass, there is a good chance of sweeping Chinch Bugs, if any, onto the cardboard where they will be quite conspicuous.

Control

For many years, Chinch Bugs defied control by any insecticide. With the advent of newer types, there are now chemicals that are lethal to Chinch Bugs. Scotts Pest Control is effective but as with all other controls, the timing of application is of prime importance. It must be applied when the weather is clear and warm. The affected spots and surrounding areas of three feet or more should be treated to check the possibility of spread from treated to untreated grass. The best

practice is to treat the entire sun-bathed lawn, making application with the SCOTTS SPREADER.

First Aid After Injury

Since Chinch Bug damage may develop fast, some program of rehabilitating the grass may be needed. The following suggestions may help to restore a vigorous growth so the effects of attack are lessened.

1. As often as there is evidence of brown grass, rake or brush out the dead, matted stems to encourage the roots to send up new shoots to revive growth.
2. Make a light feeding at half normal rate.
3. Sow seed lightly over the injured areas to start new plants.
4. Keep the lawn well watered — Chinch Bugs will then be less active and the grass roots will be more apt to send up new growth.
5. During this period it would be better to catch the clippings.

As with other insect pests, the damage from Chinch Bugs may pass unnoticed until weed or clover patches suddenly appear in the lawn. These weeds are then blamed for the damage whereas they were an effect rather than a cause. They sprouted only after Chinch Bugs had killed the grass and removed competition.

Chiggers

This bane of summer lawns is easily controlled. Just make applications of Scotts Pest Control over area with a Spreader. One dose will usually last several weeks.

Identification Service

If you find some bugs and want to be sure of identification, send a plug of the infested sod to the *O M Scott & Sons Co* office nearest you: *Marysville, Ohio; Cranbury, New Jersey; Palo Alto, Calif; or Salem, Oregon.* Cut out a section about 2 inches wide and 3 or 4 inches long that includes both injured and normal grass. Wrap the sample in aluminum foil so it will stay moist en route. Do not wet sample.

Sod Webworms

Sod Webworms are small grayish larvae that eat off grass blades above the plant crown. The affected patches are small in the early stages of attack. If not checked, Sod Webworms may ruin large areas of turf. Damage will also result from birds tearing up the sod to get at the worms.

Fortunately severe webworm attacks are rare since parasites generally keep them in check. They are more apt to be troublesome in climates of lots of warm sunshine.

If small brown spots appear in the lawn in hot weather, it's a good idea to look diligently for Webworms. They are difficult to spot because of their small size, neutral coloring and ability to move swiftly.

Webworms originate from little white and yellowish brown moths that lay eggs in early summer on blades of grass. The eggs hatch within six to ten days. The young worms move down to the soil where they spin a loose silken web while feeding on the grass roots. Later they form cocoons from which the moths emerge. These moths continue the cycle by laying eggs in grass.

The Webworm in many instances has been confused with the *Army Worm*. The latter is about two inches long, having a dark gray or dingy black color with three narrow yellowish stripes on its back besides a slightly darker and broader stripe on each side. In contrast Webworms have no stripes but are covered with small tubercles each bearing a tuft of small hairs.

Control. The newer pest controls are effective on soil insects like Sod Webworms and Army Worms. Dusts or dry mixtures are probably better than sprays. Scotts Pest Control has been found satisfactory. Repeat treatments are needed.

Common Cutworms

Common Cutworms can hardly be classified as serious lawn pests. When they are present in sufficient numbers, the sod may be badly torn by birds trying to get at the Cutworms. As with most soil insects, cutworms can be checked with a Spreader application of Scotts Pest Control.

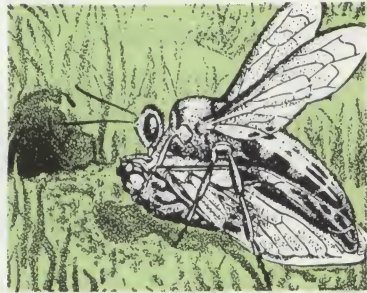


Sod Web Worms, full grown, are about an eighth-inch in diameter and a half-inch long.

Golden Digger Wasps

A terrifying yet relatively harmless insect occasionally becomes quite a lawn nuisance in August and September. This is the Golden Digger Wasp or Cicada Killer (*Sphecius speciosus*.)

The damage to lawns results from burrows that are dug about $\frac{1}{2}$ inch in diameter but from 12 to 18 inches deep. In so doing as much as a pint of granulated soil is thrown out into an unsightly mound around the entrance to the burrow. These burrows are usually dug in a sunny, dry location, often on a slope.



When the burrow is ready the female wasp goes zooming about looking for her prey — cicadas or locusts. Her actions are somewhat terrifying to humans especially when the wasps appear in large numbers. Their appearance is spectacular because of the black body, about $1\frac{1}{2}$ inches long, with golden markings and rust brown wings.

When the shrill song of a cicada stops suddenly and becomes a discordant shriek lasting just a moment, one of nature's little tragedies has been enacted. The cicada-killer has caught up with its prey, stung it into a state of complete helplessness, and started moving it to its burrow. Frequently the wasp drags its victim laboriously up a tree and then glides diagonally down toward its burrow.

After the burrow is made the wasp spends very little time in it. The female lays an egg on the body of the cicada, then departs, closing the burrow behind her.

Control. A few drops of carbon bisulphide or a few grains of Cyanogas squirted into the burrow may kill the wasp, if it is at home, and probably kill the egg, too. The same results may be obtained by closing the burrow entrance with a stone.

When there are so many flying wasps as to present a nuisance, it is said their numbers may be diminished by a vigorous attack with home-made giant fly swatters, or even with a heavy charge of a potent insect spray.

These methods are not very feasible and the best insurance against an invasion of cicada-killers is to have the ground covered with a healthy, vigorous turf. If possible, keep the ground thoroughly moist through the summer and cut the grass not shorter than $1\frac{1}{4}$ inches.

Earwig, Insect Pest

The Earwig resembles an elongated brown beetle, $\frac{1}{2}$ to $\frac{3}{4}$ inch in length. Besides having a foul odor, its appearance is repulsive because of a pair of fierce looking forceps extending from its abdomen. Earwigs often come inside the house and lurk in dark corners or closets. They are more abhorrent because of their vicious appearance, actions and habits than for any damage. They live on grass, flowers and plant leaves which they mutilate much as do the caterpillars.

Control. The newer insecticides such as Chlordane formulations are toxic to Earwigs. Since they often lay their eggs in the soil among grass roots, the lawn is the logical place for control treatments.



This lovely Scotts lawn adds to the beauty of the seashore at Newport, Rhode Island.

Controlling Mole Maneuvers

EXCEPT where their telltale ridges and mounds disfigure lawns and golf courses moles need not be discouraged. To the extent that moles destroy harmful insects, they are beneficial. The burrowing activity of moles is largely a search for food consisting of beetle grubs (see preceding chapter) and other larvae, worms, spiders and centipedes.



Few people ever get to see a mole. They are often confused with the meadow mouse and pocket gopher. The mole is distinguished by its short front legs that end in broad, rounded hands with strong claws and palms turned outward which it uses breast-stroke fashion to dig its passageways. The body is about six inches long, covered with a plush-like fur that makes the moleskin economically valuable in some European countries. The mole has a long pointed snout, a sensitive organ of touch not used for rooting. Neither external eyes nor ears are much in evidence. What the mole lacks in sight it makes up in touch, acute hearing and unusual powers of smell.

The mole seldom ventures out of the ground except possibly at night. The raised ridges of sod indicate the course of its hunting paths. The star-nosed mole may also throw up occasional mounds of loose soil.

Active Periods. In spite of popular belief otherwise, moles are not active at any particular interval. They work day or night but are more apt to extend their runways when the ground is soft after a summer rain or winter thaw.

Except for the Townsend's Mole found on the Pacific Coast, moles eat very little vegetable matter. Mostly moles devour harmful insects though they are often blamed for destruction by gophers or field mice of tubers and bulbs and other roots. Moles may indirectly cause this damage since their runways are used by pocket gophers, field mice, and other rodents as a way to get at one of their favorite sources of food.

Control Methods

Destroy Food Source. Moles are seldom troublesome in turf areas except where they are attracted to grubs or other soil insects. This provides the key to elimination of moles, namely getting rid of their food supply by application of the chemical to get rid of the pests.

Trapping. Because of their suspicious nature and their keen sense of smell, it is difficult to trap moles.

The orderly nature of the little creature can prove his undoing, however. If an opening is made in his runway or is blocked with earth he will try to repair it when next he comes that way. So if a break is made with the foot and a trap properly set, it should serve its purpose when the mole starts repair operations. He will back away from a poorly set trap and burrow under or around it.

Mole traps are of two general types, the kind that grip or choke and the harpoon trap. The harpoon trap is easier to set but some moles may escape if the prongs do not strike a vital spot. One kind of gripper trap works on a choker-loop principle, others on scissor-jaw or diamond jaw principles.

Direct Attack. With a little time and patience the activity of a mole can be observed as he extends his burrow. Then opportunity is given for quick kill with a spade, pitchfork, or other sharp instrument. Some gardeners open or depress runways in the hope of later slipping up on the mole in the act of repairing.

Gas Attacks. Since mole runways are pretty well confined, they afford some opportunity for extermination by fumigation. Calcium cyanide dust available in the convenient commercial product "Cyanogas" is effective though some trouble to use. This material is poisonous to humans, animals and plants. A teaspoonful of carbon bisulfide inserted at five or six foot intervals is also said to be effective, if the openings are carefully closed.

Any automobile provides a possibility for mole extermination. By use of a length of hose the lethal carbon monoxide from the exhaust of a running engine can be carried into mole runways. Friction tape may be used to make a suitable connection between the exhaust pipe and the hose. The car should be operated in the open for 15 minutes or more. Any gassing attack is more successful when the ground is wet and less porous so the fumes are better confined to the runway.

Skunks and Raccoons

Those living in the country often report that Skunks and Raccoons do a lot of damage in tearing up their lawns.

Usually these predators are after juicy grubs, earthworms or other soil insects that are especially appetizing to them. If the source of food is eliminated, they will then work elsewhere, the same as moles.

Gophers and Crawfish

The pocket gopher is another small animal that tunnels underground but usually so deep as not to harm lawns. Gophers



Left: Typical volcano shaped mound thrown up by some species of moles. Center: The mound of soil excavated by a pocket gopher is one-sided and kidney shaped at the surface because of the way it is pushed up. Right: Chimney shaped mound made by crawfish operating in wet soil.

feed on succulent roots, tubers and bulbs. They often use mole runways to get at this food source. They are not known to harm grass roots.

The common crawfish or crayfish is objectionable because of its ugly burrows. These animals are easily destroyed by placing a teaspoonful of carbon bisulfide or Cyanogas in the entrance and covering the hole to retain the poisonous fumes.

CHART OF SEASONAL



LIME — Most any lawn east of the Mississippi will be benefited by regular use of lime to overcome high acidity. (See Chapter II). Raw ground lime can be applied any time of year with late winter probably best. *The standard rate is 25 to 50 pounds per 1000 sq ft.* Can be evenly and quickly applied with Scotts Spreader.

FEEDING. A must in late-winter or early spring. It's a good idea to get **TURF BUILDER** on before grass starts growth. Easy Spreader treatment.

WINTER WEEDS. Some of the ugliest weeds may pop up in February or March—for example, Wild Onion or Garlic. They should be stopped with applications of 2,4-D type weed control as soon as growth starts.

In Jap Beetle zones, it may be advisable to apply pest control as preventive measure. Late winter is good time.



SEED as early as possible to give young grass head start over hot weather. General seeding suggested at light rate with the Spreader. If done in early spring alternate freezing and thawing will work seed into good soil contact since frost action will likely bury seed.

MOWING. Start as soon as anything to cut. Mow fairly close in cool weather at one or 1½ inches. Shorter cutting encourages lateral spread of grasses.

WATERING. A couple of weeks without rain, with bright sunshine and brisk wind may develop a need for watering long before summer.



SCUTL program may well start about lilac and apple blossom time to stop annual weeds like Crabgrass, before they get a start in the lawn. Further benefit is in reduction of damage by turf diseases such as **LEAF SPOT**, or *Dollar Spot*. SCUTL is Spreader applied. *Repeat treatments are needed, the early program at 21 day intervals.*

MAINTENANCE



Dandelion control is easily accomplished by Spreader application of WEED & FEED or 4-XD.

Early summer feeding is helpful to most lawns.

CRABGRASS may begin coming in rather strongly in June — if the early SCUTL program has not been carried out. After Crabgrass starts to spread, SCUTL at 5 to 7 day intervals through July, possibly into August depending upon severity of invasion.

MOWING height may well be raised a half inch with the advent of real summer heat.



SUMMER INSECTS may harm grass or take pleasure out of use of the lawn. Spreader applications of Pest Control can reduce damage or annoyance of chiggers, ants, mole crickets — even keep away moles and skunks by eliminating their food source.

If new lawn to be seeded in fall or old one renovated, get program started in mid-summer.

MID-SUMMER FEEDING is suggested for lawns in competition with trees or for those who wish to have the greenest possible grass through the summer.

Chickweed and similar vining weeds may be controlled in summer with SCUTL or 4-XD. SEDGE or NUTGRASS with 4-XD applications to damp vegetation.

CRABGRASS Not checked by earlier treatments may get tough, wiry and shoot seed spikes. Control measures should be taken to stop ripening of seeds to add further Crabgrass woe the following year.

Early fall is best time of year to fix up the lawn or to seed a new one.

FEEDING — one or two feedings in the fall months will be good help to any lawn.

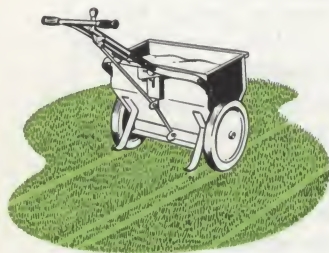
SEEDING — Late summer is nature's grass seeding time. Follow her good example.

MOWING can be closer in cool fall weather. A must if lawn is seeded since tall grass smothers seedling plants. Continue mowing long as grass grows.



How To Use The Spreader

Close spreader as you come to stopping point. Keep it closed while backing or turning around to avoid extra dosage.



Overlap as you would with a lawn mower to insure complete coverage.

irregular areas, being careful to shut off spreader in backing and turning. Move bracket to a leaner setting in cut-up areas.

Plan to operate spreader in the direction of the longer dimension of lawn. First apply two spreader widths across the shorter sides. These "headers" provide room for turning around at the end of each of the long strips. Then go back and forth from one header strip to the other until entire area is treated. When approaching these end zones, shut off spreader in order not to make double application. Next do the

If there are trees or shrubs in the lawn, shut off the spreader as it is pushed around them — otherwise adjacent grass may receive double or triple dosage. Use same care in treating slopes and terraces. In high wind cover hopper with cardboard, burlap sack or heavy paper.

Care of Spreader

1. **Empty** spreader before storing. To remove all material from bottom of hopper, move spreader away from lawn area. Set spreader wide open at No. 20. Run it back and forth vigorously a few times so that all material flows from hopper.

2. **Clean off.** Leave spreader in open position. Brush or wipe off all materials. If spreader becomes damp during use and wet materials stick to it, wash with coarse stream from hose. Dry thoroughly with rags after washing.

3. **Oil** spring located in housing below Rate Scale Plate. Place a few drops of oil on axle between wheel and hopper, at each end. Then stand spreader on end and oil between axle and wheel hubs. Repeat on opposite end. If this is neglected, wheels may lock because of rusting. Light penetrating oil will usually loosen.



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